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CONTENTS.

Editorial Notes	921
Institute Affairs	922
The Salt Lake—Los Angeles Railroad	922
Market Conditions	922
Labor Conditions in Australia	923
Metallics	923
The Colorado School of Mines ....*William Magenau*	924
Regeneration of Cyanide ....*William Orr*	924
The Geologist in Practical Mining *C. W. Purington, Rob't K. Painter and Chas. R. Keyes*	924
Bauxite in 1902 ....*Chas. N. Jenks*	926
*The Malay Tin Deposits ....*R. A. F. Penrose, Jr.*	926
*The Sain Alto Tin Deposits, Mexico *J. Nelson Nevius*	929
Observations on Gold Deposits....*C. W. Purington*	929
Emerald Mines in Colombia	931
The Testing of Building Stone ....*Edwin C. Eckel*	931
American Institute of Mining Engineers	932
Hoisting Signals for Mines	933
*A Point in Concentration ....*M. A. Knapp*	933
German Potash Salt Deposits	934
*Ascertaining Average Silicon in a Foundry Iron Mixture ....*A. W. Walker*	935
The Function of Gold	935
Lake Superior Traffic	935
Copper Production of the World	935
Abstracts of Official Reports	936
Books Received	936
Books Reviewed	937
*The Card Concentrator	938
*Alcohol as Fuel for Oil Engines	938
Recent Decisions	938
Correspondence	938
Questions and Answers	939
*United States Patents	939
British Patents	940

* Illustrated.

DEPARTMENTS

Assessments	953
Chemicals, New York and Foreign 951,	956
Coins, Foreign	953
Dividends	953
Financial Notes	952
Industrial Notes	942
Markets: Coal, United States and Foreign	949
Iron and Steel	950
Metals: Gold, Silver, Copper, Tin, Lead, Spelter, Antimony, Platinum, Quicksilver, etc. 952,	953
Mining News: United States and Foreign	944
Mining Stocks	948
Obituaries	941
Personals	941
Schools, Technical	942
Societies	942
Stock Market Review: United States and London	948
Stock Quotations 954,	955
Trade Catalogues	942

THE SHIPMENTS of iron ore from Lake Superior ports in May did not make up for the later opening of navigation and other delays in the early part of the season. The total quantity of iron ore passing the Sault up to June 1 was 4,024,205 tons; a decrease of 434,107 tons, or 9.7 per cent, as compared with the corresponding period last year. This does not include the shipments from Escanaba, which are said to have been about the same this year as last. The May traffic through the Sault canals, it may be added, exceeded that of any month on record, the total freight reported being 5,185,017 net tons; thus reaching the great average of 167,355 tons a day.

⚒

THE INTERNATIONAL Coal Miners' Congress now in session, at Brussels, in Belgium, is discussing, among other questions, that of a universal strike of all the coal miners in the world, thus stopping entirely the production of fuel until the demands of the congress are satisfied. The principal advocates of this extraordinary measure are the representatives of the French and German miners, who are much impressed with the importance of the project. The English representatives are reported to be very doubtful about the outcome of such a measure; which speaks well for their judgment. The chief difficulty in the way seems to be that the miners in the United States are not in any way affiliated with the International Congress, and the first step to be taken is the appointment of a committee to confer with the leaders of the miners' unions in this country. A universal strike seems to be rather a large project, and we may well doubt whether the movement will meet with success, especially as American miners are in a very different position from those of Europe, and have few interests in common with them. We may add, that the International Congress is largely political in its nature, and that the socialist seems to be the ruling party.

IT HAS BEEN observed for some time that with increasing competition in the market for zinc ores, there has been a tendency to demand from assayers of such ores a greater degree of accuracy in their determination than was formerly considered necessary. Coupled with this demand for increasing accuracy was a desire for the adoption of standard methods of making determinations which should insure better results than those which have been heretofore obtained. The causes of discrepancies in assays are now being investigated by a sub-committee, appointed by the New York Section of the Society of Chemical Industry. This committee contains some well-known experts, and through its efforts more than 30 chemists, including some prominent analysts not actively connected with the zinc industry, have consented to take an active part in the research. The work will take some time to complete, especially as a thorough revision of many published methods, which were formerly accepted, will be required, but there is no doubt that its results will be very interesting and of much value to all concerned. We are pleased to note that this matter is in good hands, and we hope to be able, when the investigation is completed, to give its more important results.

⚒

OUR CONTEMPORARY, the Dahlonega *Nugget*, has evidently been considering some of the problems discussed in our recent issues, in regard to the relation of geology to mining. We quote the following:

"The assistant United State geologist has come and gone, but what kind of a report he will make we do not know. He was raised in a county containing but little gold, and what he knows is gathered from books and people, which doesn't amount to much. Uncle Peter Garrett, who has worked in the mines for years, is more able to give a correct report of the mineral resources of the county than any 'book man,' and needs the salary worse, yet it goes to the one having the most book 'larning.'"

Uncle Peter is evidently one of those towers of strength whom one encounters in a quiet village, whenever information concerning the local geology and meteorological conditions are in question. To the oldest living inhabitant and local professor, the ways of the scientific man are doubtless rather annoying, for he shatters so many of the brilliant fabrics of theories that have to be swept aside like the garden hose playing upon the dew-laden film of a spider's web. The professor of the village grocery might well quote the saying of Descartes that if dreams are real while they last, why should not life after all be only a long and restless dream.

⚒

THE APPOINTMENT is announced of Dr. Victor C. Alderson as president of the faculty of the Colorado School of Mines. Dr. Alderson has been, for the past ten years, dean of the Armour School of Technology at Chicago, and he is regarded as a thoroughly competent man. He will start his duties with the good wishes of the institution with which he has been honorably connected and the good-will of the school whose direction he now assumes. Several members of the old faculty of the Colorado School of Mines have been re-engaged, among them being

Profs. H. B. Patton, Arthur R. Curtis and Claud F. Filkins. The chairs of mining and metallurgy, two of the most important departments, are still vacant. On the selection of good men for these appointments the reputation of the school will, in a large measure, depend; therefore, we trust every effort will be made to secure authoritative lecturers. In this endeavor, as in all his labors, the new president will have our cordial good wishes. The post which he fills is an important one on account of its relation to an industry fundamental to the prosperity of a large and important region. We have lately discussed this matter as it affects Colorado and its neighboring States. We trust the new president will escape the pitfalls which tripped his predecessors, and that his administration may be fortunate enough to be saved from the interference of the politicians; while, on the other hand, we hope he will always command the cordial support of the mining and metallurgical engineers resident in Colorado.

⚒

ELSEWHERE IN THIS issue we give the estimate of the copper production of the world, prepared by Messrs. Henry R. Merton & Co., of London. While some changes may be made in this by later official figures, it approximates closely the actual results, as the compilers are qualified by long experience and thorough acquaintance with the world's markets to prepare such a statement. The estimate puts the total copper production of the world in 1902 at 542,470 long tons; an increase over the previous year of 23,682 tons, or 4.6 per cent.

The total figures show that the increase in the output of copper in the world was less than for several years previously. The gain in production over a series of years has averaged about 8 per cent, while last year, as shown above, it was less than 5 per cent. This condition is coupled with a largely increased consumption, which is altogether likely to continue, in view of the growth of the demand for the metal for electrical work.

The striking fact shown by the table referred to is that nearly 65 per cent of the copper supply of the world comes from the mines of North America. With the larger production now being made in the United States, and with the great increase probable in Mexico, and the expected gain in Canadian output, it appears altogether likely that this proportion will increase rather than decrease. Even should the promised supply from Central Africa actually materialize, it will be several years before the production in that region can be of any considerable importance.

⚒

INSTITUTE AFFAIRS.

On another page we publish Circular No. 4, sent out by the secretary. It relates chiefly to the Carnegie gift and the conferences which have taken place in connection with the proposed Engineering Building. Most of the facts have already been announced in the ENGINEERING AND MINING JOURNAL; it remains but to add that, in order to facilitate and legalize the action of the Council in behalf of the Institute, in co-operating with the other engineering societies in accepting Mr. Carnegie's offer, it has been found advisable to submit an amendment to the rules of the Institute and to authorize the gentlemen of the Council to act as trustees in behalf of the members of the Institute. Post cards have been sent out, asking each member to vote on these propositions and, on inquiry at the office of the Secretary, we find that out of several hundred responses already received only two negative votes have been recorded.

The fee for life membership has been increased from $100 to $150, in accordance with the amendment to Rule III, which was proposed at the New Haven meeting and approved at the last meeting, held at Albany, in February.

We are glad to learn that Mrs. Van Slooten has donated to the library of the Institute the whole of the library of her late husband, William Van Slooten, who became a member in September, 1884, and died in December, 1901. This gift includes over 600 volumes on mining and metallurgical subjects, very few of which are duplicated by books already on hand. This valuable donation was, we are pleased to learn, prompted by the comment made recently in these columns by way of explanation and cordial endorsement of the recently organized library of the Institute.

The subscriptions to the library fund are coming in slowly, and the importance of the fund does not seem to be fully appreciated. It is worthy of earnest support. Visitors to the library are increasing in numbers as the facilities which it affords are becoming known.

The next meeting of the Institute will take place at New York City, in October. Owing to the difficulties which arose in the effort to arrange an excursion to British Columbia, and on account of the important matters arising from the Carnegie gift, it is deemed desirable not to have the meeting at a distant point, but to serve the best interests of the Institute by holding the next session in this city.

⚒

THE SALT LAKE-LOS ANGELES RAILROAD.

A good deal of interest has been aroused among those interested in mining operations in the West by the completion of arrangements to finish the construction of a cross-country railroad which will extend from Salt Lake City to Los Angeles. It is likely to be an important factor in the development of the arid region which covers southwestern Utah, southern Nevada, southeastern California, and northwestern Arizona. All those who have traveled in the great mining region which stretches from the continental divide to the Sierra Nevada have had reason to emphasize the fact that the lines of railroad run due east and west, paralleling each other at great distances, but devoid of interlocking branch lines. While Nature has not been bountiful in matter of beauty to the great tract of country which stretches in weary perspective around the geographic center where Utah, Nevada and Arizona meet; while, even to those who know the West, it is a never-never land, a land of original sin and canned vegetables, an aching desolation, whose waters hide themselves in subterranean channels, nevertheless, in spite of a repelling aspect, it is known to be a region of great mining possibilities and in the face of natural obstacles of a most serious kind, there have already been made mineral discoveries of sufficient moment to give more than a name to such districts as Frisco, Beaver, Pioche, De La Mar, Groom, Deep Creek, Yellow Pine, Gunsight and Ivanpah. Nor is the country unblessed by cultivation. There occur those small oases of verdure which, though they are separated from each other like islands in mid-ocean, nevertheless do minister to the support of the restless men who scour the surrounding wilderness in search of metallic wealth. To such scattered communities, pluckily developing the mine or the farm, this railroad will bring such a union of interests and such communication with the main arteries of commerce as will stimulate the life-blood of their activities.

The railroad will have the new harbor of San Pedro as its Californian terminal, thus affording an outlet for the coal of Utah, which should find a ready market along the Pacific Coast. It is also expected that the inauguration of this railroad enterprise will lead to the opening up of the iron deposits of Utah, already in course of exploitation at Desert Mound, where the Colorado Fuel and Iron Company is now carrying on vigorous explorations. On the whole, the outlook seems most promising. Certainly such camps as Pioche, De La Mar, Ely, Goode Springs, etc., can give a large tonnage of ore if only the freight rates are made reasonably low. Whether the output will go to the coast or to Salt Lake is a nice question, which it is not for us to answer. As it stands, in its largeness of idea and its promise of aid to a vast territory until now cut off from the industrial centers of this country, the Salt Lake-Los Angeles Railroad does credit to the promoters, Senator W. A. Clark, Senator Thomas Kearns and Mr. R. C. Kerens.

The enterprise emphasizes one fact, namely, the resourcefulness of the West. It is the output of the copper mines of Butte and the United Verde, and the precious metals produced by the Silver King Mine, at Park City, which have afforded the sinews of war to the organizers of this far-reaching scheme. We trust that the outcome will be the development of new mines no less notable than those which have given the money for the construction of this new artery of commerce and the birth of communities no less energetic than the two fine cities which are at length to be united by a link of steel.

⚒

MARKET CONDITIONS.

The metal market continues rather quiet. The depression in Wall Street is having a certain effect and consumers still seem somewhat reluctant to come upon the market, except when their necessities compel them to do so. Consumption in almost all lines continues large on old contracts, but new business is scarce.

Copper continues unchanged, buying being still comparatively moderate. Manufacturers are taking a little more interest in the market, however, and a few sales have been made. Some producers, who have been rather holding back in anticipation of getting better terms, are now meeting the market more freely, and taking their share of what business is going.

Tin has been somewhat firmer, the stocks of spot metal having been absorbed or having gone into strong hands. There is little or no surplus in sight just now, although some good arrivals are expected.

Lead is rather quiet, with the usual consumptive demand. There is still a good deal of difficulty about deliveries, owing to the floods in the West. On June 17, the chief producer and seller made a reduction of $5 per ton in prices.

Spelter remains strong. Spot metal is very scarce, and manufacturers who need immediate supplies have had to pay a good price for them. The Western

floods have almost entirely put a stop to shipments for the time being, and there is no certainty as to when deliveries can be made. The Joplin ore market remains strong, the surplus stocks being well cleared out, while the operation of some of the mines is still interfered with by high water.

Silver is quiet and shows little change. The Eastern demand just at present is light and there are no considerable orders in sight.

The iron market is still a waiting one. New business does not come forward, and buyers are holding back in the hope of securing concessions. The mills and furnaces insist that no concessions can be made, but there are some signs of weakening. The reduction in Southern pig iron has been followed by moderate buying only. The building strikes continue to interfere with the demand for finished material, and there is little new to be reported.

In the Western coal trade local business is quiet, but Lake trade is very active. Shipments of coal up the Lakes, up to June 1, were the largest ever reported, and coal is still being rushed forward to the lower ports.

The Atlantic seaboard bituminous trade continues to show improvement, and prices grow firmer. Car supply is unsatisfactory, but the railroads are very strict about coal standing in cars at tidewater.

The anthracite trade continues brisk with demands strong from all over the country. The strike talk has caused some uneasiness in the trade, but there are no prospects of a serious strike this year.

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LABOR CONDITIONS IN AUSTRALIA.

It is inevitable that comparisons should be made between the labor difficulties existing in this country and those which are evidently distracting portions of the Commonwealth of Australia. The recent abrupt termination to the strike of railway employees in Victoria by reason of the decisive action of the Government which itself owns the railways, furnishes an encouraging example of the ability of that State to suppress disorder. Like the earlier strike in Holland, that in Victoria represented the dissatisfaction of laborers not against a corporation or a company, but against the community itself as represented by a government elected by popular vote. It represented the effort of that section of the Labor Party, which aims at pushing the principle of State socialism to a point where individual enterprise is snuffed out. In so far as this incident is concerned, "they do these things better" in Australia than in any country, for it is done, not by a show of militarism, but by the outspoken voice of public opinion, the one weapon for dealing with the excessive demands of capitalists and laborers alike.

Another episode invites comment at this time. It appears that there was a dispute over the rate of wages to be paid to miners in the Cue, Day Dawn and Nannine districts of the Murchison gold-field and of the Peak Hill gold-field. The matter was taken for settlement to the Arbitration Court of Western Australia, in which these districts are. This submission of the dispute is in accord with the State law, which requires compulsory arbitration under such circumstances. The Court made an award which gave an increase in wages of about 75c. per shift, as compared with the scale obtaining on the Kalgoorlie gold-field. While this increased burden upon mines working at a narrow margin of profit is serious in itself, it is felt by thoughtful men that the principle applied in making the award is much more likely to be hurtful to the industry than the mere rise in the wages. As a fundamental idea for regulating wages, the plan was adopted of making the Kalgoorlie rates a fixed basis, with an increment in the amount of pay proportionate to the distance from that center. This means, of course, that the districts which happen to be geographically distant from Kalgoorlie will have to struggle under the incubus of excessive wages, even if the conditions of living are otherwise favorable. As one-half of the gold product of Western Australia comes from the Kalgoorlie field, it tends to put a severe tax on operations in the scattered camps to the north and northwest. The natural disabilities under which the great gold-fields of the desert have made such striking headway are quite heavy enough without this foolish imposition of a fresh tax. Of course, it is another illustration of the influence exerted by mob orators; it also results from the fact that the balance of power in several of the Australian legislatures is held by the labor representatives, many of whom are merely walking delegates in another guise. In Victoria disputes over wages have been left to boards of conciliation which, like the Arbitration Court just referred to, and like our own Coal Commission, have fallen back on the last resort of timid men—the split-the-difference method, which is no principle at all. It is no wonder that several Westralian mining companies have decided not to spend fresh working capital in exploratory work, that large numbers of miners are out of employment, and that the future of the region is crossed with a dark line.

So far we, in this country, have not had this experience; the administration of property is still controlled by the responsible element in the community and any attempt to apply such crude ideas of politcal economy has not made much headway. Nevertheless, our Coal Commission, with its sound ethical doctrines and convincing talk regarding the maintenance of law has shown how a body of representative men of the highest order will inculcate one doctrine, while practising another. The award of the Anthracite Commission was contradictory to its findings. In effect it was equivalent to saying to the striking miners, your claims are unwarranted, your statements of fact are wrong, but we will grant a part of your demands for the sake of peace. It was only the earnest desire for a settlement which prevented a stronger public protest than was actually made, when the report of the Commission was published. No such arbitration methods will ever serve the purpose of permanently improving the relations between the employers and the employed. Justice is better than expediency and plain dealing is more to be desired than sentiment which disregards fact.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

A shaft has recently been finished at the Ronchamp Colliery, in the Haute-Saône, France, which is 3,314 ft. deep. The work of sinking was commenced in 1896, and over five years was occupied in completing the shaft to its present depth. The temperature at the bottom of the shaft, as taken recently, is 116° F., when that at the surface was 59° F., showing an increase of 57°, or 1.72° for each 100 ft. of depth.

Boring in Spain has resulted in finding what is believed to be a good quality of anthracite at Caiera, near the old mines of Pennaroya. A company has been formed in Madrid to develop these mines.

The continuous open-hearth process, in which the molten metal flows from the blast-furnace to the mixer, from the mixer to the steel furnace, and from the steel furnace to the ingot-mould is perhaps the best illustration of a labor and fuel-saving process which can be found.

The capacity of the latest type of blast-furnace is shown by the record of furnace No. 1, at Clairton, Pa., which, during the week ending May 25, turned out 3,647 tons of pig iron, or 521 tons daily. This production required the handling of about 2,000 tons of material—ore, flux and coke—put into the furnace, with a corresponding quantity of slag to be disposed of besides the pig iron. The furnace is 85 by 21 ft., and during the week in question ran on 92 per cent Mesabi ore and about 8 per cent siliceous ore.

Among the largest castings ever made were two steel castings, weighing 165,000 lb. each, recently made at the Bethlehem Steel Works. They are parts of a 12,000-ton armor-plate press for the Carnegie Steel Works.

Mr. Thomas Green, of Westwood, England, appears to be the dean of English coal miners. He was born in Staffordshire, in 1825, and began work in the colliery at Wolverhampton in 1833, as a pit-boy when only 8 years old, and has worked continuously ever since at various collieries, refusing to retire, although urged by his friends and relatives. He finally gave up work on April 25 last, the 70th anniversary of his first entry into a mine. During this long period Mr. Green was remarkably fortunate, never having had a bone broken, though he was burned by an explosion of gas some 40 years ago. His health is very good, and he has apparently a prospect of living some years in retirement.

In the Wohlwill electrolytic process for the direct refining of impure gold or gold bullion, a certain quantity of hydrochloric acid or an equivalent amount of an alkaline chloride is used in the electrolyte to suppress the evolution of chlorine from the anode and thus cause a dissolution of the gold. The electrolyte is a strong aqueous solution of gold chloride (25-30 grams gold to the liter) impregnated with free hydrochloric acid or an alkaline chloride, as sodium chloride. These latter substances, however, combine with gold chloride to form readily soluble compound or double salts of gold, known as the *chlor-aurates,* so that the electrolyte properly speaking is a solution of an aurate. The quantity of these substances necessary to be added, depends on the temperature of the electrolyte and the current density; for hydrochloric acid it is about the same by weight as the gold content, while for sodium chloride it is somewhat less. The following two equations represent the dissolving of the gold during electrolysis:

$$(1)\quad Au + 3Cl + HCl = HAuCl_4$$
$$(2)\quad Au + 3Cl + NaCl = NaAuCl_4$$

while the equation $AuCl_3 = Au + 3Cl$ represents the electrolytic deposition of gold; the hydrochloric acid and sodium chloride, not being decomposed by the current, may be viewed as carriers of gold chloride.

The process is in use at the United States Mint at Philadelphia, Pa., and has been in use for many years at the German refineries.

The metallic impurities in gold bullion consume a certain quantity of hydrochloric acid amounting in value to about *one cent* per $1,000 of deposited gold. The cost of power even in a small refining plant is very little, not over 2 cents per $1,000 of refined gold. The chief drawback in the process is in refining bullion containing very considerable amounts of copper, silver, etc.; in such case more or less frequent renewal or purification of the bath becomes necessary.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

THE COLORADO SCHOOL OF MINES.

The Editor:

Sir.—Referring to the JOURNAL's recent editorials on the Colorado School of Mines, I would add to Mr. L. S. Austin's protest, appearing in your issue of May 30, that the present condition of that institution's affairs does not imply that the internal administration has not been efficient in the past. The criticism of the faculty's attainments has small warrant, and certainly in point of intelligent zeal and loyalty, they have more than compensated for the occasional lack of distinguished records for which richer colleges are able to pay. While this is a phase of the subject which may not be exploited in the public prints, it is desirable that the impression many must gain from your editorial of May 16, and but partially corrected in that of May 30, be tempered by the opinions of others who have knowledge of the conditions from other standpoints.

The faculty, as Mr. Austin points out, was chosen by Dr. Chauvenet, and from an educational standpoint, results have justified his choice. Recognition that the elevation of the school to a recognized eminence in the West, especially considering its limited financial resources, has been no less than a wonder-work by Dr. Chauvenet, is the least that should be accorded for his distinguished services. To have taken the institution in its infancy, with none but a local standing, and through the infusion of a persistent policy of betterment and elevation of standard, and at undoubted personal sacrifice, to have endowed it with an individuality which has been one of its strongest holds, is an achievement which ought to lose none of its credit by the unfortunate condition of ill-qualified political control which your editorial rightly laments.

The School of Mines for many years was free of this. What its effects are may be seen in similar institutions in other Western States, which have never risen above mediocrity.

The plan of having such a school an independent institution would seem to have some advantages. In a professional school especially individuality is of no small value, and experience has shown that, with such exceptions as Columbia and Berkeley, no mining department of a university has gained the distinctive name that is enjoyed by several of the independent State schools, although some of them are very good.

The present uncertain condition of the Colorado School—without president or faculty—must be one of grave concern to its alumni and other friends, and it is earnestly to be hoped that a head will be found capable of sustaining its past good name, and that a policy of "hands off" be maintained by the semi-political administrators which the school's State charter calls for. Undoubtedly these ends would be much more likely of realization were there more money at hand, and it would seem there could be no more timely opportunity for the large Colorado corporations and miners to show their public spirit and work unquestionable benefit to themselves, as your editorial ably suggests. The School of Mines has directly brought into the State far more capital than has been expended for its equipment and administration.

WM. MAGENAU.

Guanajuato, Mex., June 7, 1903.

REGENERATION OF CYANIDE.

Sir.—I have just had my attention drawn to an article in your issue of May 30, on the "Regeneration of Cyanide Solutions after Zinc Precipitation," by Mr. Andrew Crosse, and read by him before the Chemical Society of South Africa.

Five years ago I devised a method for regenerating sodium or potassium cyanide from the double cyanide of zinc and sodium or potassium, and two years ago I took out a patent in this country (Patent No. 689,017), which was an improvement on the method which I had first employed. This process of regeneration is at present in use in several plants in the West. At the Chloride Point Mill, Utah, when my process for regeneration was first installed there, the plant ran for over a month without the addition of any fresh cyanide, using instead the cyanide regenerated from the double cyanide of zinc and potassium held up in solution. I found that to obtain good precipitation at the ordinary temperature with sodium sulphide, the double cyanide of zinc and potassium had first to be dissociated by the addition of a certain amount of alkali, when 60 to 75 per cent of the zinc contents (depending on the quantity of zinc present and also the amount of free cyanide present) could be precipitated without leaving free sulphide in solution, but to obtain complete precipitation of the zinc, heating of the solution had to be resorted to.

Equation 1. $ZnCy_2\ 2KCy + 4NaOH = Zn(ONa)_2 + 2NaCy + 2KCy + 2H_2O.$

Equation 2. $Zn(ONa)_2 + 2NaCy + 2KCy + XH_2O + Na_2S = ZnS(pptd) + 2NaCy + 2KCy + 4NaOH + XH_2O.$

Heating of the solution to obtain this object is not practicable, as it is neither necessary nor desirable to remove entirely the double cyanide of zinc and potassium from solution, and a clean, active solution can be kept by the occasional precipitation of the zinc as mentioned above; besides, heating the solution to a point sufficient to throw down all the zinc, produces a reaction between the sulphide and cyanide, forming sulphocyanide, a compound which is much more harmful in the solution than considerable double cyanide of zinc and potassium.

Another very beneficial result of the removal of the zinc by the sulphide in this process is that, during the precipitation, the zinc carries down, sympathetically I think, other salts (such as antimony, arsenic and considerable lime, as sulphate) which are detrimental to the solution.

After several years experience with this process I have never found the alkali increase in solution, as one would expect from the equation, possibly because in every case the ore on which the solution was used had an acid reaction.

Regeneration of the H_2S from the ZnS, as suggested by Mr. Crosse, has not been used here, as it was found more economical to use Na_2S (solid, containing 66 per cent Na_2S) which costs from 2 to 3c. per lb. delivered at the plants in 500-lb. drums.

The cost of regeneration of the sodium cyanide from the double cyanide of zinc and sodium by my method is from 3 to 5c. per lb. of sodium cyanide regenerated, depending on the amount regenerated and the cost of chemicals at the different plants.

My object in drawing your attention to this article is to show that the method suggested by Mr. Crosse, to be used by the cyanide operators in South Africa, has been in use in this country for some years.

WILLIAM ORR.

Denver, Colo., June 5, 1903.

THE GEOLOGIST IN PRACTICAL MINING.

The Editor:

Sir.—The discussion regarding the geologist in his relation to mining has been prolonged to a considerable length, and I assume it to be near its close in these columns. I hope, however, that you will permit me to add to it a few words, having especial reference to the work of the United States Geological Survey.

However the function of the geologist in practical mining, conducted as a private enterprise, may be defined, the function of the geologist as a public servant, and permit me to add, benefactor, is very thoroughly understood by the Geological Survey. This body of disinterested men, under the directorship of its able and energetic chief, has during the past ten years, not to mention previous work, performed labors which cannot but command the respect of all.

To take a single example, I refer to the exploration of Alaska. In that little-known, and not overhospitable territory, work has been conducted, under difficulties and hardships, which from the standpoint of its usefulness to the mining industry, is worthy of the highest praise. If the Survey has in some cases written obituaries, the coming generation may point to the fact that it also made wise birth-prognostications, and occasionally drunk a health at the christening.

Rome was not built in a day, neither can that titanic labor, the preparation of the Geologic Atlas of the United States, be completed in a decade. But copies of the folios already issued, well-thumbed by use, may be seen not only in mine offices, but in many a lone cabin of the Rockies or the Sierras, and such bear witness to the value of the Survey work to the mine manager, the mine foreman and the prospector.

Mr. Knox, in your issue of June 6, says that the geologist "fares ill" as a result of the discussion. There are many kinds of geologists, as there are many kinds of miners, and there are those followers of both occupations who must inevitably fare ill when the value of their work is brought under discussion. There can hardly be a question to-day, however, that the work of the economic geologist deserving of this name is held in the highest esteem by mining industrials generally, whether or not they are endowed with an "inherent mining instinct."

The bringing forward of the proof of this inherent instinct which Mr. Knox calls for would, I fear, entail a discussion of a special character lying outside the province of the ENGINEERING AND MINING JOURNAL. If specialization shall finally proceed so far that, as Mr. Argall suggests, the mining botanist is produced, we may also hope to develop the mining biologist, and to him must be relegated the duty of passing ultimate judgment on this interesting theme.

C. W. PURINGTON.

Denver, Colo., June 12, 1903.

The Editor:

Sir.—The discussion in your columns under the heading "The Geologist in Practical Mining," seems to me to have digressed somewhat from the line of thought indicated by the title, so that an expression from the point of view of a mining engineer would perhaps not be out of place. Some of the earlier letters, while no doubt just in many of their expressions and true in particular cases, seem to me open to criticism in that there can be little doubt that the disposition evinced "to throw stones at the other fellow" does not tend to the advancement and honor of the profession as a whole. I think we must each recognize in others an ability, perfected by training and experience, enabling them to follow out some branch of the work with a greater portion of success than ourselves.

Many of your readers can remember the time when the profession of mining engineering was unrecognized, or when professed was often recognized with contempt. The owner of a mine used to be the manager of it and "the practical miner did the work." The fact that this combination was not uniformly successful created the want for a business man with technical training and practical experience, competent to manage a property advisedly for the owners. To supply this demand arose the profession of the mining engineer as indicated, I think, by both Mr. Bain and Mr. Argall. The industry has grown and the various branches have called for specialized ability, hence the metallurgist, electro-metallurgist, mining geologist (differentiated from the geologist of pure science), etc., etc. The practical miner we have always had and always will have, for, I think, every mining engineer would be prompt to admit him a very essential factor in the successful working of a mining property.

The industry has become too large, I think, for any worker in one branch to feel that he can, with-

out special preparation, step into the work of another branch and manage it as successfully as the man who has been working along that line for years, and had previously fitted himself for it by some kind of education. As a young engineer then, I would express this ideal of the profession—the financially successful management of mining properties. As Dr. Egleston often said, "Metallurgy is the science of making money out of ores." So mining engineering is the business of making money out of ore-deposits. The mining engineer often must call in the consulting geologist, mechanical, electrical or possibly civil engineer, all of whom have chosen to fit themselves to be of special aid along these lines, but this does not justly detract from his prestige or theirs, for the day has come when no one man can "know it all" in any line of business.

ROBERT K. PAINTER.

Dumfries, Va., June 3, 1903.

The Editor:

Sir.—In the very interesting and highly instructive discussion which has been going on in the columns of this journal during the past few weeks on the subject brought up by Mr. J. E. Spurr, it is quite clear that most of that author's statements are largely misconstrued. After a most careful reading and re-reading of Mr. Spurr's article, I fail to find a single statement that can serve as a valid ground for the sweeping denunciation of the efforts of the geologist in the field of mining. I see no reason whatever for the caustic criticism on the geologist's work that has been indulged in. Critical analysis of the various reflections soon demonstrates that in each case a man of straw has been set up and then knocked down with the utmost satisfaction.

There is one feature of the discussion that is particularly painful. This finds intensified expression in the statement that the published geologist's accounts of mining districts are "obituary notices of mining camps." As an off-hand witticism on certain festive occasions such a remark might not be entirely out of place. As essence of deliberate sarcasm it is not only decidedly inopportune in serious controversy, but is worthy only of twelfth century fanaticism. Studied repetition of such phrases, in this year of our Lord 1903, indicates only too clearly that there are some persons who are still unable to grasp, much less appreciate, the march of modern science. And the latter, as we all know, Huxley has happily said, is only enlightened common sense.

The work of State and Federal geological surveys is too valuable to be spoken of so lightly. The men engaged in this work are too much in earnest and too broadly trained to have their results sneered at in such a manner. There are no doubt many persons who are not able to read the reports understandingly, and many persons who cannot find in them just the information they may be seeking, but these accounts are too precious to be condemned without reservation. My own observations on all classes of people interested in the mining industries, from the man who strikes the drill to the most scholarly and unpractical doctrinaire, have been that mining has been advanced more through the investigations of government and private geological surveys than by any other one factor. The high esteem, with which geology in its bearings upon mining is held by intelligent people, is clearly shown by the support of special government geological bureaus by every civilized State on the face of the globe.

There is nothing that I can find in Mr. Spurr's statements that would lead me to infer that he had urged the claims of the geologist over those of the miner in the work of discovery, exploration and development. Yet most of the participants in the discussion have assumed this to be the main theme, and have endeavored to apologize for the very existence of such a being as a geologist.

It is not the miner alone who has advanced the mining of to-day to the high position which it holds in industrial circles. Its exalted place as a legitimate venture is due very largely to modern business methods and business men. Some of the latter may have been also miners or mining engineers, but many of them have never hit a drill or touched a transit. Mining to-day is like every other business enterprise. Without good, hard business sense there is little hope of successful mining on a large scale. A man may be ever so good a miner—even a Cornishman—but if he lack proper business qualification his mine will amount to nothing. A geologist may be ever so astute a doctrinaire, but if he be a good business man, there is nothing to prevent him from being successful in mining. There is in reality no antagonism existing between miner and scientist. The one is as necessary as the other. Their fields are different; but they may work to a common end. The business man—the man who makes mining go—draws freely upon both.

To the business man engaged in delving after the treasures of earth, mining is to-day as capable of being put upon a secure business foundation as any manufacturing enterprise. From start to finish mining may be carried on with the certainty and dispatch of the running of a railroad train, or the sailing of an ocean liner. Lucky "finds" will, of course, continue to be made; but as a business proposition mining will no longer be a vast lottery—ever developing to their fullest extent the gambling propensities of mankind.

To me, one of the grand achievements in science during the lately closed nineteenth century was that which enabled the great industry of mining to be brought under rational control. I think that it has been largely through modern geology that it has been possible to place mining upon a basis truly scientific. Up to the time of the establishment of modern geology there was excuse for haphazard mining. Although the ordinary miner is still slow to grasp the advantages held out to him by science, every large mining enterprise now has the geology of the district carefully examined before the first shovelful of dirt is turned. Most of the great mining companies even have a regular geological corps employed all the time. One of the greatest petroleum concerns at present operating owes its immense success, not so much to questionable business methods, as so often claimed, as to far-sightedness in employing at a large salary the scientist who worked out, by purely scientific methods, the geology of natural oil. An officer of one of the largest iron companies of the Lake Superior region recently said that if he and his associates had only placed even a little faith in the State geological survey twenty years ago, they would have saved hundreds of thousands of dollars. This company, as myriads of others do constantly, then believed firmly in "practical" work, not in "scientific" work.

The frequent statement one hears made by miners that "one man cannot see any farther into the ground than another," as if such argument triumphantly closed all further discussion on the subject, is not only not conclusive in its nature, but it is wholly untrue. Whether or not one individual can see farther into the ground than another depends entirely upon the person. And the distance which each individual can look beyond the surface of the ground into the depths of the earth is about proportional to his broadness of mental vision, his training in sound geological principles, and his geological field experience. It makes small difference whether the individual under consideration be miner, engineer, geologist, or business man, the principle holds good. But the inference is conclusive that of these several classes of men mentioned the one trained best in geological science must necessarily have vastly the advantage over all others. In the natural order of things this advantage lies with the geologist. And so far as my observation goes this is clearly recognized by the business man.

Another claim that is almost universally urged by the miner is that the geologist has never discovered any mines. This is only true in a sense. It depends entirely upon the point of view whether or not the statement is absolutely correct. If it is meant that the geologist does not go out prospecting for mineral as does the miner, the statement is true to this extent. There are thousands of prospectors to every geologist. The geologist rarely if ever goes out prospecting in the same sense as the miner. The geologist's work begins usually at a later stage of the development, when his attention has been called to a property.

On the strength of the fact that the geologist, or the mining engineer, actually does see farther into the ground than the prospector, determines commonly whether or not money is invested in the property. If a big mine is developed, it is certainly not wholly because of any discovery of the first prospector who located his claims in this particular place, but because the man with broader geological insight who came along saw much farther into the ground than the original finder of an outcropping, and saw very differently. There is a second discovery that is of far more importance than the first, and this is the one that, as a usual thing, makes a mine what it really is. The real honor of discovery of the mine belongs to the man who has interpreted properly the geological conditions and structures. He may be a trained geologist or he may not. It is a well-known fact that every mining claim represents to its first discoverer fabulous hidden wealth, but in a very large number of cases it is also known that the prospector is willing to part with his property for a very small part of this great prospective sum. If a large mine open out on such a property, it is surely not always the miner who located the claim who discovered the mine.

To even a casual observer of the mining industry it cannot but be apparent that the subject of the geology of mining is one which is rapidly growing in importance; and it must continue to grow in value. It makes little difference what the miner and the geologist may think of their own relative merits and value in mining operations. It is nevertheless a fact that the business man—the man who makes the mine go—is turning more and more to the geologist for aid. I may here repeat that the miner and the geologist should not in reality hold antagonistic attitudes, and so far as I know the latter does not harbor any such sentiments. The fields of the two classes of workers are very different; their activities are quite distinct; each may derive great benefit from the other; their spheres are attractive, not repellant.

It was for this very fact of the general recognition by business men, of the rapidly growing appreciation of geology in mining matters, that in the New Mexico School of Mines there was recently established a distinct department of mining engineering, called the Geology of Mineral Deposits. The cardinal principle involved is based upon the important fact, developed during the past decade among mining men, that a mining enterprise to be most successfully carried out is dependent as much upon a proper knowledge of the geological structure and nature of a district, as it is upon the construction of the most carefully planned equipment. The student in mining engineering is encouraged to specialize along one of these branches of the main subject. He may emphasize the metallurgical side, the mechanical side, or the geological side. All are equally important in modern mining. And modern mining demands expert work. A mining engineer must be par excellence a mining engineer, and besides being a mining engineer he ought to know more about some particular branch of mining engineering than any one else.

As the editor of this journal has well said, mining is one of the most difficult occupations followed by humanity, and we need all the knowledge possible.

One thing there is that people interested in mining overlook. They too frequently fail to separate clearly fact from theory. The geologist is not all theory. Neither is the miner all fact. As a rule, the former has far more fact upon which to base his deductions than has the latter. In every mining camp the atmosphere is full of theories, which are fancied as facts. The miner has a perfect right to his theories, but he should not claim them as facts. What the practical miner needs is more of actual fact to re-

place some of his theories. What the geologist should have is more of localized theory to adjust his facts.

As stated in the beginning, the fields of the geologist and of the miner are very different. In the business of mining both must necessarily be drawn upon by the astute man of business. It is idle to argue that one or the other is useless. Both may be mutually helpful. The geologist, I know, is greatly indebted to the miner, and I have never heard him hesitate to say so. Many a miner, I am sure, can get from the geologist vastly more than he now does. The discussion clearly shows that what we all wish is a better understanding all around.

CHARLES R. KEYES.

New Mexico School of Mines,
Socorro, June 1, 1903.

BAUXITE IN 1902.

BY CHARLES N. JENKS.

The supply of bauxite from the fields of Georgia and Alabama during 1902 was very light in comparison with some former years. The Republic Mining and Manufacturing Company is operating at Rock Run, Ala., but has been unable to ship much, on account of the caving in of the deposit, and this will yet take about two months to clean up. When in shape to mine, there will possibly be several thousand tons of fine bauxite at this point before it is exhausted. The company is also working in a small deposit near Ridge Valley, Ala. W. S. Perry, formerly superintendent of the Southern Bauxite Company, and now president of the Harrison Brothers Chemical Company, of Philadelphia, Pa., is now doing some prospecting in the old workings of the company in Alabama, and is also working and shipping 50 tons daily from the Walters bank, near Rome, Ga., but this is about exhausted. Aside from this, but little is doing in Alabama or Georgia.

An effort was made during 1902, and is still in progress, to open and develop the groups of deposits owned and controlled by the Dixie Bauxite Company, of Rome, Ga., and by Col. B. F. A. Saylor. Their properties control the situation in Georgia and Alabama, carrying over 2,000,000 tons of high grade ore, and have been held for some years pending the formation of a company, which should handle the product from the deposits through the various reduction processes to alum and alumium on the ground. The American Bauxite Company, of Boston, Mass., was formed in 1902, with this idea in view, but it has not as yet acquired the properties.

The Pittsburg Reduction Company has been mining bauxite in Arkansas during 1902, with what success I am unable to state accurately; but I understand from good sources that the bauxite occurs in shallow beds, it is not at all uniform, and quite remote from the railroad. The company has, however, erected a cleansing plant at some point in Missouri, on half-way ground, I think, at an expense of $200,000, where the bauxite is, partially at least, freed from impurity before it is sent to the reduction plants in the East.

The Georgia and Alabama bauxite is in all respects superior to the Arkansas ore, and when the deposits of the Dixie Company and the Saylor deposit are opened they will furnish a high grade of ore for many years to come.

The Norton Emery Wheel Company, of Worcester, Mass., the largest abrasive wheel concern in the world, has erected quite an extensive plant at Niagara Falls, N. Y., where in 1902 and during the present year they have been manufacturing, by an electro-chemical process of their own, an artificial corundum from bauxite. This is said, by the company, to be far superior to any abrasive product on the market, as it is tougher than carborundum, and of great cutting efficiency. It is also said to be a more economical product than either natural corundum or carborundum.

The indications point to a very heavy production of bauxite in the future, as the demand for its various products is rapidly growing.

THE MALAY TIN DEPOSITS.*

BY R. A. F. PENROSE, JR.

Geographic Position of the Malay Tin Regions.—The Malay Peninsula is the southeastern extremity of the continent of Asia, extending from about latitude 14° N., in a southerly and southeasterly direction to about latitude 1° 20′ N., and consisting of a narrow strip of land about 900 miles in length and from less than 50 miles to over 150 miles in width. The northern and central parts of the peninsula belong to Siam, though the British possessions of Burmah include some of the northwestern part. The southern part of the peninsula is comprised mostly in the native States of Perak, Pahang, Selangor, Negri Simbilan and Johor, ruled by independent sultans, but more or less under British influence, and recently combined under the name of the Federated Malay States. Along the lower coast of the peninsula the British own certain strips of land and islands known as the Straits Settlements.

The Federated Malay States at present comprise most of the tin regions worked on the peninsula, and tin deposits occur in greater or less quantities from the State of Johor in the southern extremity of the peninsula, northward to the limit of the State of Perak on the Siamese border, a distance of some 350 miles. To the north of this limit, in Siam, tin has been reported, but the deposits have not been much explored, and no very prominent mines have been opened. By far the larger part of the tin of the peninsula is mined in the States of Perak and Selangor, while very little has been found in Johor and the production of Pahang and Negri Sembilan is small. Perak supplies considerably over half of the tin of the peninsula, and the Kinta District is at present the most important tin locality in that State, though tin is also mined at Thaiping and other places. In Selangor the most important mining center is Kwala Lumpur, and the production of this region is second only to that of the Kinta District. Besides the places already mentioned many other smaller tin districts exist, and in fact most all of the numerous small native towns on the west slope of the peninsula are largely dependent on the tin industry.

To the southeast of the peninsula, tin is mined on the islands of Banka and Billiton, which are owned by the Dutch; and the occurrence of the ore is said to be similar to that on the peninsula. Tin is found also on the island of Sumatra on the southwest coast of the Malay Peninsula, but has not been worked to any great extent.

General Geology of the Malay Tin Regions.—The Malay Peninsula consists of a central axis of rugged mountains with occasional subordinated parallel or diverging axes and isolated peaks. The whole region is covered by a jungle of tropical vegetation so dense that the roads and trails have to be hewn through it with an axe. In the tin regions the main range is composed of granitic rocks, occasionally intersected by feldspathic and other dikes, while in places are found gneissic and schistose rocks with occasional areas of a white highly crystalline limestone. The granite is mostly of a gray color and is composed of quartz, feldspar and biotite or hornblende or both. Occasionally strata of a fine grained friable sandstone occur on the lower slopes of the mountains. The granitic rocks and limestone, however, are the formations most commonly seen in the few places where any rocks appear through the soil.

All the rocks, especially those of a granitic nature, are much decayed, often to a depth of many feet, and the detritus from them has formed large areas of alluvium in the mountain valleys and along the lowlands on the coast. Much of this alluvium contains more or less oxide of tin, or cassiterite, in particles and fragments of varying size, forming

* Abstract, by the author, of an article in the *Journal of Geology* entitled "The Tin Deposits of the Malay Peninsula, with Special Reference to those of the Kinta District."

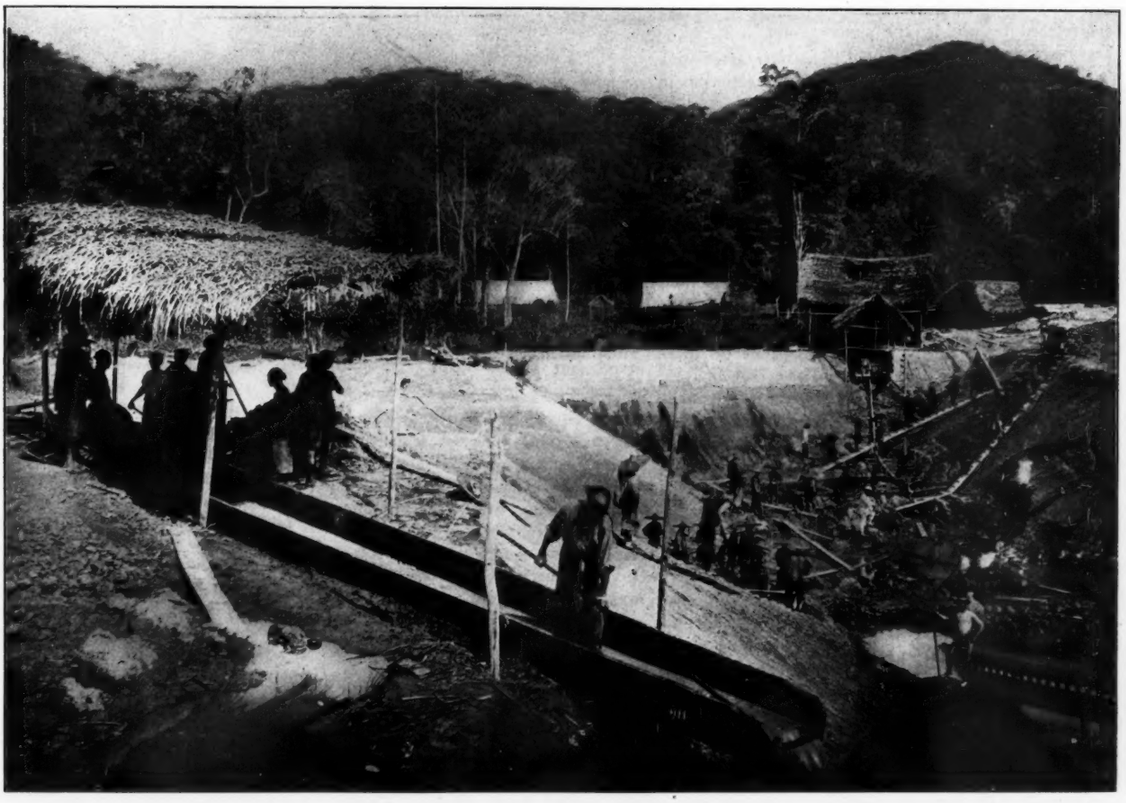
what might be termed "tin placers," and it is from these deposits that the mass of the tin of the Malay Peninsula is derived. Tin also occurs in the granitic rocks and limestone, but though these rocks, especially the granitic rocks, were doubtless the source of the alluvial tin, yet the ore in them is at present worked to only a very small extent.

Location of the Kinta District.—The tin region most carefully examined by the writer was the Kinta District in Perak. It has no definite boundaries, but the name is a general term applied to an area in the southern part of the State of Perak, in the valley of the Kinta River, comprising a more or less enclosed valley about 40 miles in length in a north and south direction, about 30 miles in width at its south end and about 5 miles at its north end. To the east is the high granitic range forming the backbone of the peninsula and rising in some places about 8,000 ft. above the sea; to the west is a lower granitic range rising some 3,000 ft. and separating the valley from the Strait of Malacca. Between these ranges are lower mountains and areas of limestone surrounded and partly covered with great tracts of alluvium. Twenty years ago the Kinta District was almost unknown, and Thaiping and Kwala Lumpur were the great tin centers, but now it is the most important district on the peninsula. Among some of the more important mining centers in the district are Kampar, Gopeng, Batu Gajah, Tronoh, Cacha, Lalang, Papan, Lahat, Chongkat Pari and Ipoh, the last being the commercial center of the district; in fact, the alluvium over large areas has been completely stripped from the bedrock in search of tin, and has been overturned in great piles, leaving the once fertile soil in a condition of desolation similar to the old gold placer diggings in parts of California.

Mode of Occurrence of the Alluvial Tin in the Kinta District.—In the larger valleys where the detritus from areas of different rocks has been mixed, the tin-bearing alluvium is commonly composed of a heterogeneous mass of white, gray or red sandy or gravelly clay, often of a mottled character, containing numerous small quartz fragments about the size of a pea, together with pebbles and boulders of granite, gneiss, schist, pegmatite, limestone, etc. The alluvium in the hills, however, nearer its source, varies more in character, distinctly reflecting, in different places, the nature of the different rocks from which it has been derived. Frequently the alluvium is much stained with iron, and often contains large

STRIPPING NEW TIN GROUND, SOUTH OF CAMPAR, PERAK, MALAY PENINSULA.

TIN DIGGINGS IN THE ALLUVIUM AT FOOT OF GRANITE HILLS, KINTA DISTRICT.



MINING AND WASHING TIN ORE NEAR IPOH, PERAK, MALAY PENINSULA.

quantities of vegetable remains and partly lignitized wood.

The tin occurs in the alluvium in different ways. Sometimes it is scattered through it from top to bottom in comparatively uniform quantities, sometimes it is in layers of rich ore separated by layers of lean or barren ground, sometimes it is richest on the bedrock and at other times higher up in the deposit. As a general rule, however, there is a covering, or "overburden," as it is called, of barren alluvium from 10 to 40 ft. or more in thickness, and the tin ground is found beneath this. The ordinary tin-bearing strata vary from 1 to 30 ft. in thickness, though sometimes they reach over 100 ft.

At the bottom of the alluvium is generally either granite or limestone, though frequently where the tin stops, barren alluvium or rock decayed *in situ* separates it from the bedrock, so that the solid granite or limestone is not always seen. The limestone bedrock is often leached in undulating surfaces with alternating protrusions and recessions, resulting in a series of natural riffles behind which cassiterite has concentrated. This occurrence is well seen along the wagon road between Ipoh and Lahat, and is similar to the way gold has collected behind limestone riffles near Columbia, in California.

Tin alluvium frequently occurs on ridges and hills as well as at lower levels in the valleys and creek beds, sometimes suggesting that since the formation of tin alluvium began, there has been an elevation of the region followed by subsequent erosion, with the result that the older tin alluvium occupies the higher places, while the younger alluvium, derived probably in part from the older deposits, occupies lower levels, in much the same way as the Tertiary gold placers of California often occupy the higher spots and the more recent placers are found in the present stream beds. This may be true in some of the tin deposits, but it is necessary to distinguish between such occurrences and the cases where the tin deposits on the higher places are simply residual deposits formed *in situ* by the superficial decay of tin-bearing rocks, without removal of the tin from the region of its source.

Nature of the Tin Ore in the Kinta District.—The tin occurs in the form of cassiterite or oxide of tin (SnO_2) often well crystallized in tetragonal prisms with fine terminations, though the fragments in the alluvium have been more or less rounded by attrition. The ore varies in color from black or brown to gray, grayish-green, white or transparent, but the commonest kind is of a dark brown color with a resinous luster. Sometimes the ore is angular and in comparatively large fragments, but this is rare, and the common alluvial tin fragments range from the size of peas to that of sand grains or smaller, while efforts are being made to work tin ore that exists as a fine powder in the mud banks that line certain parts of the west coast of the peninsula.

The amount of tin in the ore, as commercially mined, ranges from 69 to 73 per cent, an average of about 70 per cent being considered very fair. The theoretical amount of tin in cassiterite is 78.6 per cent. The richness of the tin-ground varies much in different places. The average value of the alluvium worked in the Kinta District is probably about 1 per cent of cassiterite, and ground of this grade pays well to work if favorably situated. If the alluvium contains 2 per cent of cassiterite, it is considered exceptionally good ground, and with 3 or 4 per cent it is considered remarkably rich. Sometimes thin strata in the alluvium are very rich in cassiterite, containing from 40 to 60 per cent, but this is very rare.

Minerals Associated with the Tin in the Kinta District.—With the tin in the alluvium are associated much tourmaline, hornblende, wolframite and magnetite, while in smaller quantities are found white mica, topaz, scheelite, sapphire, and it is said that in parts of the peninsula small quantities of thorium and cerium minerals have been found. Some beautiful transparent topaz crystals have been found near Tapa, south of Campar. Gold also has been found in small quantities in the tin alluvium. Certain other minerals, such as iron pyrite, chalcopyrite, bornite and arsenical pyrite, which occur with the tin in the rock, are rarely seen in the alluvium, as they have decomposed and mostly disappeared during the erosion of the rock, though rusty masses of these sulphides, partly decomposed and associated with quartz, often occur in alluvium which has not been transported far from its source.

Occurrence of Tin Ore in the Rocks of the Kinta District.—Though the tin mined on the Peninsula comes practically all from the alluvium, yet cassiterite also occurs in various places *in situ* in the rocks of the region. It is most often found in granite, but also occurs in the limestone and sandstone. It has been worked in a few localities, but none of the efforts have as yet been more than partially successful, and most of them have eventually failed, as the ore is in too scattered a condition to pay to work. It seems not impossible, however, that deposits may yet be found in the rock that can be profitably worked.

Where the tin is seen *in situ* in the granite, it occurs in pockets, small veins, or a combination of stringers intersecting each other in various directions in the form of a network, while elsewhere the rock is simply impregnated with particles and crystals of cassiterite over certain areas. The tin is associated with quartz, tourmaline, fluorite and the other minerals already mentioned, especially iron pyrite and arsenical pyrite, which often occur in very considerable quantities, and smaller quantities of chalcopyrite. Tin in the limestone is probably rarer than in the granite, as Chongkat Pari was the only case seen or heard of by the writer where it had been clearly proved to exist in that rock. At that locality tin occurs both in the alluvium and in the limestone. In the limestone it occurs as cassiterite along a zone of fracturing, sometimes as an impregnation in the rock, sometimes as lenses or irregular pockets from 4 to 24 ins. in width, and sometimes along the cracks in the rock, either longitudinally or transversely with the zone of fracturing. It is associated with large quantities of iron pyrite and arsenical pyrite, and smaller quantities of chalcopyrite and bornite, with some rhodochrosite. At Bruseh, near Tapa, in Perak, tin has been found in thin seams and films along the lines of bedding in a soft, fine-grained friable sandstone, which bears every evidence of being a comparatively young rock, and it seems probable that the tin in it was derived from tin-bearing solutions from the older rocks percolating along the bedding planes. This special locality was not visited by the writer, but specimens of the ore and the rock were seen.

Origin of the Tin Deposits of the Kinta District.—The tin in the alluvium has clearly been derived by erosion from the tin in the rocks. As regards the tin in the rocks, however, it may be said that in the granite, the occurrence of the cassiterite in veins, stringers, networks, etc., along lines of fracturing are strong evidences of aqueous deposition of the ore; while the occurence as an impregnation in the rock where no marked fissuring occurs, may be due either to concentration during a more or less molten condition of the rock or to aqueous concentration in a solidified rock. It seems probable that the tin in the limestone was deposited from aqueous solution, in the same way as at least part of the tin in the granite.

Commercial Features of Tin Mining in the Kinta District.—Most of the mines of the Kinta District are operated by Chinese, some of whom become wealthy in the industry, but in some localities English companies work the mines, while at Campar a French corporation carries on large operations. The laborers are mostly coolies from southern China and Indians from the east coast of India. The native Malays do not do much work, and Europeans cannot stand hard work in this climate. The coolies are the most numerous laborers, and here, as elsewhere in southeastern Asia, they are always found where there is any hard work to be done.

The tin-bearing alluvium is worked mostly in open cuts or large pits, except where the covering, or overburden, of barren ground is very thick, when sometimes shafts are sunk through it to the tin stratum. Most of the workings, especially those of the Chinese, are only very shallow excavations on account of the difficulty of handling the water found at a depth. The average of the Chinese pits is probably not over about 40 ft. in depth, though the enterprising Chinese mine owner, Mr. Foo Choo Choon, reached several times this depth in his mine at Tronoh before he sold it. Some of the more progressive Chinamen have lately introduced pumps to handle water, but even yet it is not uncommon to see the water pumped from a shallow pit by a chain of buckets operated by a human treadmill, worked by the feet of two or three men.

The tin alluvium, after being mined, is carried to the surface in small baskets hung on both ends of a stick suspended on a Chinaman's back. It is then dumped into wooden troughs supplied with a stream of running water, where, if there is much clay present, it is stirred with shovels and hoes to separate the tin ore. If there is no clay or only a little of it present, the tin dirt is simply dropped into the trough in the running water. The materials are carried thence by the water into sluices where the cassiterite and other heavy minerals sink to the bottom, and the sand, clay and lighter materials are carried away by the stream. The final process in the preparation of the ore is the separation, by hand picking or in pans, of the particles of magnetite and other heavy minerals still left with the tin in the bottom of the sluices, finally leaving a product varying from 69 to 73 per cent in metallic tin. This ore is then sacked and hauled to market.

At Gopeng, the Gopeng Tin Mining Company is using hydraulic monitors to handle the alluvium. At Cacha an English company has erected a 10-stamp mill with concentrating tables, to crush and concentrate masses of ore. At Sorakai, roasting, crushing and concentrating machinery have been introduced by the Sorakai Tin Mining Company, an English corporation. At Tronoh some of the alluvium contains much clay, which adheres closely to the tin, and the material is treated in large tanks with revolving paddles inside.

The tin was formerly smelted largely at local works in the various mining districts, and some of it is still treated in this way, but most of it is now smelted by the Straits Trading Company, which has a large smelting plant at Singapore. This company has great influence throughout the peninsula, and has established numerous agencies where tin is bought from the miners and sent to Singapore. The total production of tin on the Malay Peninsula in 1901, was almost 47,000 tons, which is over half the tin of the world, while the production of the peninsula and the islands of Banka and Billiton together amounted to over three-quarters of the production of the world.

The tin lands on the peninsula are either bought or leased, and the government of the Federated Malay States imposes an export tax on tin ore of almost 12 per cent of its value. As tin is the main product of the peninsula, the tax affords a large income, which is the principal support of the government. The money derived from this source has been wisely expended, generally under British advice, in internal improvements. Excellent wagon-roads have been built throughout the different States, and railroads have been constructed in a number of localities. As yet the latter have not been connected throughout the peninsula, as they are being extended only so fast as funds are obtained to build them. It is expected, however, that before long the isolated lines of railroad will be extended, so that there will be continuous connection from the extreme southern end of the peninsula at the town of Johor to the Siamese boundary on the north.

IRON ORE IN GREAT BRITAIN.—Further borings at the Ronhead mines of Messrs. Kennedy Brothers, in the Furness District in England, have proved that the deposit of hematite is of large extent, but the company has not yet fully proved the area it covers.

THE SAIN ALTO TIN DEPOSITS.

By J. Nelson Nevius.

The mountains south of Sombrerete and west of Sain Alto, in the State of Zacatecas, Mexico, have been frequently mentioned in connection with deposits of tin ore. The region yields a small amount of this metal annually, but it is much less than is commonly supposed.

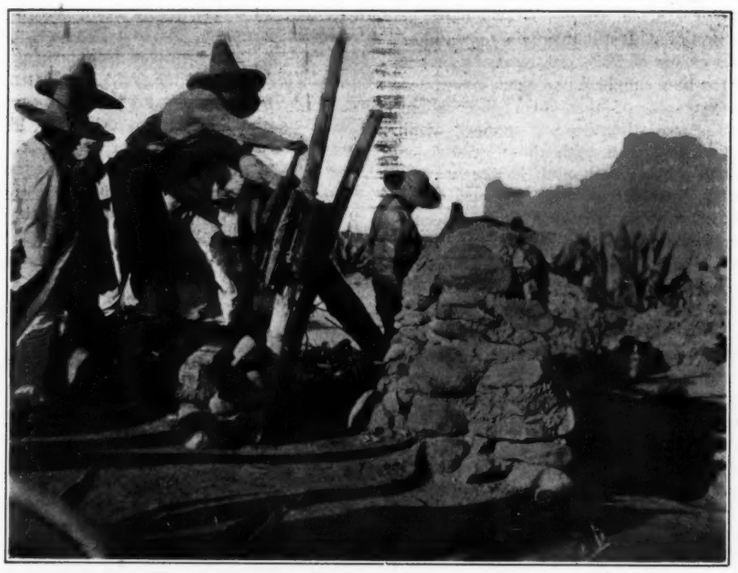
The mountains are all of rhyolite, which has been forced up through the vast thickness of thin-bedded shale and limestone, generally accredited to the Cretaceous age. The rhyolite is quite uniformly rifted in a general northwesterly direction, and the fracture planes thus produced give access to the circulation of water which occasionally causes considerable decomposition of the rhyolite along the fractures and the impregnation of oxides of iron, manganese and tin. Small chambers have been found along these seams from which a few tons of good tin ore have been extracted. No regularity in the occurrence of such deposits has been determined, and none can logically be expected to occur. In these seams the tin oxide is badly adulterated with iron and manganese oxides.

In many places bands of the rhyolite occur carrying amygdaloids of chalcedony. Such outcrops are frequently mistaken for vein indications. Along with this chalcedony, occasional nodules of cassiterite are to be found, which, after weathering out of the rock, become concentrated in the deep ravines. This is the source of most of the tin produced in this district. The native ranchmen, during and after the rainy season, search the ravines and recover the ore. Nearly all of it is picked by hand from crevices in the rocks over which the streams flow. The natives pay little attention to the small banks of gravel, although, by panning, these yield a very small amount of fine ore. The sides of the ravines are so abrupt that no gravel deposits can accumulate along them. Where the streams leave the mountains and flow out upon the surrounding plains, large areas of sand and gravel have accumulated, and it is possible that these deposits may contain valuable amounts of tin ore. At present the ranchmen recover all the available ore from the stream beds and the seams in the rhyolite are not sufficiently promising to warrant development, although several claims have been *denounced* (taken up) upon the neighboring mountains.

Amygdaloidal deposits of chalcedony occur in other parts of Mexico in rhyolitic formations along with cassiterite; apparently they can be regarded as an index when searching for that ore.

At Rancho de las Cuevas, near Sain Alto, the ore is smelted in tiny stone furnaces with charcoal as fuel. Such a furnace consists simply of a firebox about 4.5 ft. high and 10 by 5 ins. in section, tapering slightly downward, and lined with refractory clay. At the bottom an opening allows the metal to run out upon the ground as fast as it melts, and on the opposite side two tuyeres enter, about 8 ins. above the ground, the blast being supplied by two circular rawhide bellows worked by hand and blowing alternately. Like all of the contrivances used by the Mexicans for handling ore, this furnace is far more serviceable than it appears to be. The ore is classified visually by estimating the amount of iron and other impurities it contains, as *"metal de* 6 (7 *o* 8) *arrobas,"* an arroba being 25 lb. This means that 6, 7 or 8 arrobas are required of the corresponding class of ore to produce 100 lb. of metallic tin; therefore, *"metal de* 8" contains 50 per cent tin, while *"metal de* 6" contains 75 per cent, within 3.5 per cent of the analysis of cassiterite; a commentary on the care with which the ore is collected. The photograph shows one of these smelters in operation.

The following statistics were compiled from the bills of sale of metallic tin purchased in Sain Alto during three years, which documents were courteously loaned by the purchasing agent. The grade of ore is taken at 40 per cent, because considerable of the ore smelted in those years came from some of the old mines. The iron and manganese in the ore as mined reduced the grade and made the charge refractory in the furnace.



TIN SMELTER, RANCHO DE LAS CUEVAS, MEXICO.

Metallic Tin Purchased in Sain Alto.

Year.	Weight of metallic tin-kilos.	Price per kilo Mexican money.	Total value.	Grade of ore. (estimated).	Weight of ore in kilos.
1900	201.60	$ .925	$186.48	40%	504.00
1901	441.00	1.169	515.53	40%	1,102.02
1902	145.70	1.140	166.10	40%	364.25
	788.30		$868.11		1,970.27

As nearly as could be ascertained, the sales in Sain Alto represent about one-third of the production for the years mentioned. The larger producers sell their metal at higher figures to actual consumers in Zacatecas and Mexico City. Therefore, the production of tin ore from this region was about as follows, stated in short tons: 1900, 1.5 tons; 1901, 3.5 tons; 1902, 1 ton. No figures are available for the current year, but a few tons will be smelted after the rainy season.

TONKIN COAL.—The manufacture of briquettes from the coal of the Honghai mines in Tonkin, has been very successful, and nearly all the coal mined is now used in that way.

OBSERVATIONS ON GOLD DEPOSITS.

By Chester Wells Purington.

(*Continued from page* 894.)

Another example of the association of gold and platinum is worthy of being cited. In the spring of 1901 I had the opportunity of examining a placer mine situated on Althouse Creek, a tributary of the Illinois River, in Josephine County, Oregon. The rocks of the district which is drained by the Althouse Creek are almost entirely of a basic nature, and a limited amount of diorite represents the only moderately siliceous rock. Serpentines and chloritic schists, with which is associated a considerable amount of bedded massive chrome-iron garnet,[27] are the prevailing rocks. Gold-bearing veins of irregular size and distribution cut these rocks, and are known to the miners as "pockety." It is from these veins that the gold of the placers is derived. In a clean-up of the placer gold at which I assisted, 50 oz. of gold were recovered, associated with which was 0.5 oz. of platinum, with some osmiridium. The gold exhibited the characteristic results of attrition, as did the platinum to a less degree, but it was evident that the sources from which the two metals had been derived were near at hand, and not greatly removed, one from another. The region of southwestern Oregon is pre-eminently one of basic rocks, with associated metal deposits, such as nickel, cobalt, platinum, which one would expect to occur in such an area. Many gold placers are worked there, and a few veins are being opened in the serpentines and chloritic schists.

Mr. Spurr says, "The intimate genetic connection of these typical gold-quartz veins with distinctly basic rocks, such as those of the diabasic family, may be safely called exceptional." I make bold to maintain that the association of gold-bearing quartz veins of normal type with rocks of extremely basic character, from which often a genetic connection may be reasonably inferred, is by no means exceptional. In the Guianas of South America, one of the cases quoted by Mr. Spurr from Phillips and Louis ("Ore Deposits"), in support of his hypothesis, investigations have shown that the occurrence of gold is not dependent on the distribution of the granite, but on that of the diabase. Messrs. Quelch and Harrison, the geologists of the British Government at Demerara, informed me in conversation that the gold, at any rate in Demerara, is dependent on the diabase, which penetrates the granite and the other rocks of the country in dikes. Mr. J. D. Harrison, in a published report,[28] says: "The acidic rocks of the district, whether gneiss, granite or porphyrite, do not appear to be the original sources of practically any of the gold of the auriferous gravels of the district, which have probably all been derived from the basic rocks, either the diorite, the older intrusive rocks, now epidiorite and hornblende schist, or the diabase, or from parts of the acidic rocks impregnated with the metal by percolating water during their intrusions. The parts of the diabase rocks which are the richer in the iron ores and especially in pyrites are also the richer in content of gold."

In the spring of 1899 I had the opportunity of making observations in the gold fields of the Saramacca River in Dutch Guiana. The country was for the most part slate and schist, and the only igneous rock found over an area of 50 square miles was diabase. Auriferous veins were found in slate intercalated with the schistosity. The gold obtained in Surinam is mostly of alluvial character, and that of the Saramacca field is no exception. Little opportunity was afforded for noting the appearance of the veins. It is worthy of note, however, that in the richest of the placer ground which was examined, the bedrock was diabase. The peculiar rough and unworn appearance of the gold of the Guianas appears to preclude the belief that it has moved a great distance from its original habitat in the veins. The

[27] Determined for me through the courtesy of Dr. Charles Palache, of Harvard University. This material has recently been referred to in several mining journals as jade.

[28] J. D. Harrison, "Report on the Geology of the Essequibo, Potaro, Konawaruk, and Demerara Rivers," Georgetown, Demerara, 1900, p. 69.

patchy character of its occurrence is also evidence along the same line. If one believes that this gold originated in quartz veins, one must admit that it has traveled no great lateral distance, and may therefore argue with some reason from the underlying rock, as to the nature of the rock which was originally associated with its veins.

In the Yenesei District of Siberia, to the east of the Yenesei River, and to the north of its tributary the Angara, I visited several of the principal gold-bearing areas in the summer of 1898. The country for the most part, on the Tala, Uderei, and Boorovaya creeks, tributaries of the Angara, is slate and contorted schist, of argillaceous and carbonaceous character. There are smaller areas of sandstones and metamorphic limestone. The rocks are penetrated in all directions by quartz veins, from which it seems highly probable that the gold of the placers has been derived. These placers are now practically worked out, but in view of their not inconsiderable product (26,530 poods, or 434,030 kilograms, roughly, $225,000,000 in gold),[29] and the remarkably simple rock association, I consider the region worthy of mention in the present discussion. The only igneous rocks seen in the course of 300 miles of journeyings in the Yenesei District, were basic rocks, resembling peridotite. On the Boorovaya Creek, at the property of Mr. Goodkof, 75 miles to the north of the river Angara, dikes of peridotite were seen cutting the slates, and large boulders of peridotite appeared in the gravel dumps. Boulders of this very basic rock were seen in many of the placers of the Uderei and tributary streams, but only in the instance cited was the rock seen in place. Granite was not found, and diorite only in a few instances. I am not, of course, prepared to say that large areas of siliceous rocks do not exist in the Yenesei District, but the alluvial material of the placers does not testify to their presence. The evidence seems to point to the peridotite as the rock with which the gold was genetically connected, if one is to believe its origin due to the influence of any igneous rock.

As Mr. Spurr has himself called attention to the Appalachian gold region, it is proper to refer, in a discussion of his paper, to the interesting occurrence at the Haile Gold Mine in South Carolina, which has been several times described.[30] I have made several visits to this property, and no clearer case has come to my notice of the association of gold ore with basic dike rocks. Situated in an area of hydro-mica schists, now silicified by the influence of the ore-bearing solutions, the principal mine workings are found to closely follow dikes of diabase. These dikes all cut the rocks, and it is in the silicified slate bands, directly in contact with the dikes that the best ore-shoots occur. As one gets away from the dikes, the values in the veins decrease. In the southern Appalachians in general, where gold-bearing quartz veins occur, dikes are almost a constant phenomenon. They are in most cases of a basic character, those of siliceous make-up being exceptional.

In discussing the southern Appalachians, I would call attention to one statement made by Mr. Spurr in his general summing up. It appears to me that he has fallen into an error from the fact that he has failed to keep in mind the physical characteristics of a vein. He says, "It is recognized that the metals (in the Appalachians), though present, are constantly far less abundant than in the Cordilleran region." This is true. It is not true, however, as Mr. Spurr affirms, that a vein discovered in the Appalachians will "directly peter out." The chances are that ore found in the region will prove of very low grade, as at Dahlonega, or of a pockety character. The veins are, however, as continuous in length as in most mining regions, and they have in some instances been worked to a considerable depth. If in the southern Appalachian gold belt, it is found that one of the intercalated lenses of quartz in the schist or slates "peters out," the miner knows, or should know that by cross-cutting in the right direction, it is likely that another lens will be found, which overlaps the first in longitudinal extent. The tenor of the Appalachian deposits has been found to be of low grade, much lower than is the experience in the Rocky Mountains or in California. It is another thing, however, to affirm that veins give out. The Haile Mine, where it is the custom to keep development work some years ahead of the mill, the Ducktown copper deposits, and the zinc deposits at Franklin Furnace, are hardly examples of ore deposits which have been found to directly peter out.

Sir Archibald Geikie, in his "Founders of Geology," says, "If geologists" . . . "could only be brought to realize that the addition of another paper to the swollen flood of our scientific literature involves a serious responsibility," . . . "how greatly would they conduce to the real value of this science which they wish to serve." If he who writes a paper on ore-deposits takes a responsibility, how much greater is the load assumed by him who adds to his own remarks promiscuous citation from the great body of past literature, in support of this or that hypothesis. Bearing in mind that unrelated facts are in themselves of no more use than are the separate parts of a steam engine, strewn about on the floor of a building, I still maintain that authors of the theories of ore-genesis, classifications of ore-deposits, and the like, should found their views more largely on the results of their own observations. Citations from previous literature, if confined within a narrower range, dealing with those occurrences of ores of which the author himself has been a witness, serve better their desired end. By such a concentration of literature would much of the speculative reasoning, of doubtful value, be eliminated from the discussion of the interesting science of ore-deposits. While not questioning the fact that Mr. Richard Beck[31] may have conscientiously recorded the results of his observations at Berezovsk, and the conclusions drawn therefrom, I am inclined to question the value of Mr. W. H. Weed's citation,[32] thus at second-hand, in support of his statements regarding magmatic quartz veins.

The San Juan region of Colorado has been quoted to a considerable extent by writers who have obtained their information by other means than direct and careful observation of its phenomena. As an example, Mr. Spurr says, "Prof. Kemp has called attention to the San Juan region in Colorado, where the different veins have been classified by T. B. Comstock as follows: 1. The northwest system with tetrahedrite. 2. The east and west with bismuth, and less often with nickel and molybdenum. 3. The northeast with tellurides and antimony, and sulphur-compounds of the precious metals.

"The same writer cites, in this connection, the Telluride district in Colorado, where a heavy vein is cut out and faulted by a later one of different metalliferous character."

Referring first back to the writings of Dr. T. B. Comstock,[33] in the "Geology and Mineralogy of San Juan County, Colorado," I find that the above generalizations were made on certain veins occurring in a small area of what has since been termed the Silverton quadrangle of the United States geologic atlas. In view of the careful work recently done in that area by Mr. Ransome, of the United States Geological Survey, Dr. Comstock's classification can hardly be accepted as final. In the second paper of Dr. Comstock,[34] "The Geology and Vein-Structure of Southwestern Colorado," he very reasonably states that "it is not claimed that the opinions here expressed are such as can withstand the sifting to which other years of inquiry must subject them."

Referring next to the writings of Prof. Kemp[35] quoted by Mr. Spurr, I find remarks as follows, in addition to the classifying of the veins above noted: "There are in this district four sets of fissures, but only one carries the ores." . . . "In one instance the Smuggler vein is faulted by the Pandora, a later vein which does not carry ores sufficiently rich to be mined profitably." The above statements of Prof. Kemp are, as he states, partly inferred from my report on the Telluride quadrangle[36] of the San Juan region. But it seems to me that to interpret my conclusions that the northwest veins of the Telluride quadrangle are the more important ore-carriers into a statement that only one set of fissures carries the ores, is much like bending a fact to suit a hypothesis. I say nothing in regard to Prof. Kemp's conclusions, I object to his premises. Again the work on which my report was based was done in 1896, and I was limited geographically in my observations so as not to include the Camp Bird vein, which at that time was little developed. Prof. Kemp's paper[37] was published in 1901, and yet he quotes a statement of mine made five years before that the Pandora vein carries no ore. That is probably true, in the Telluride quadrangle. If Mr. Ransome's suggestion is correct, however, and I believe it is, that the Pandora and Camp Bird are an identical vein, it follows that the Pandora in the Silverton quadrangle, has proven singularly productive in gold. This Prof. Kemp could have satisfied himself of, had he been at the pains to make observations for himself in the San Juan. As it was, he attempted to support a speculation in regard to the origin of ores by the general application of a statement of mine which applied, and was intended to apply, only to a portion of the district under consideration. My statement was simply, "No remunerative values have, so far as has been ascertained, been found in the Pandora vein."[38]

I have shown in the Telluride report that there is good evidence that the majority of the veins of the quadrangle were formed at the same time, and from Mr. Ransome's statements in the Silverton *Bulletin*[39] it is plain that he does not regard a well-defined succession of ore deposition in that part of the San Juan as by any means proven. As for the contents of the veins, it is only necessary to refer to the published maps of the Telluride and Silverton quadrangles, and to look at the lists of ore and gangue minerals which have been found in the various mines, to disprove any statements that veins having certain directions are characterized by certain minerals, and that those running at angles to them contains different minerals.

The San Juan region of Colorado is easily accessible, and all are at liberty to make such observations as they see fit in that classic laboratory of ore deposition. Those investigators who desire to make use of its phenomena in support of their views should avail themselves of an opportunity to visit the mines in person, rather than to quote, at second and third hand, observations which must have more or less of temporary value in a district which is so rapidly undergoing development.

The thorough and painstaking work of Mr. F. L. Ransome on the Silverton quadrangle can perhaps best be appreciated by those who have had experience in that part of the country. In summing up his observations on the fissures he says, "While many of the fissures in the Silverton quadrangle, including some which differ widely in direction, were formed at substantially the same time, there have been later periods of fissuring, also followed by vein deposi-

[29] M. Shostak, "Gold Mining Industry of the Tomsk Mining District." Tomsk, 1896, p. 10.
[30] G. F. Becker, "Gold Fields of the Southern Appalachians," United States Geological Survey, 16th Annual Report, pt. 3, p. 306. Also H. B. C. Nitze and H. A. J. Wilkins, "The Present Condition of Gold Mining in the Southern Appalachian States." *Transactions* vol. xxv, 1895, p. 767.
[31] "Erzlagerstatten," 1891, a book at present inaccessible to me.
[32] "A further Discussion on Ore Deposits," ENGINEERING AND MINING JOURNAL, April 18, 1903, p. 595.
[33] T. B. Comstock, "Geology and Mineralogy of San Juan County, Colorado, *Transactions* American Institute Mining Engineers, vol. xi, 1882, p. 189.
[34] "The Geology and Vein-Structure of Southwestern Colorado," *Transactions* American Institute Mining Engineers, vol. xv, 1886, p. 256.
[35] J. F. Kemp, "The Role of the Igneous Rocks in the Formation of Veins," *Transactions* American Institute Mining Engineers, vol. xxxi p. 179. Also, "Ore Deposits of the United States and Canada," New York, 1900, p. 288.
[36] "A Preliminary Report on the Mining Industries of the Telluride Quadrangle, Colorado," 18th *Annual Report* United States Geological Survey, pt. 3, p. 745.
[37] "The Role of the Igneous Rocks in the Formation of Veins."
[38] *Op. cit*, p. 834.
[39] "A Report on the Economic Geology of the Silverton Quadrangle, Colorado. F. C. Ransome, *Bulletin* United States Geological Survey, 182, 1901, pp. 56, et seq.

tion." . . . "This generalization, however, should not be taken too rigidly, as it is very probable whenever a prominent set of nearly parallel fissures were formed, other fissures intersecting the dominant set at various angles were produced at the same time."

The above quotation exhibits the moderation of statement characteristic of the conscientious observer, and partakes neither of the dogmatic certainty of the library theorist nor the hasty generalization of the geologist on horseback. To offer harsh criticism in the course of discussion of a subject so freshly explored as that of the distribution and genesis of ores is both unwise and unjustifiable. I make bold to suggest, however, that there are different ways of studying ore-deposits. To march hastily through a mine drift, and to scramble into a few show-off stopes under the necessarily hurried guidance of the mine foreman or shift boss; to visit one or two of the principal mines of a district in company with a large party whose ideas are for the most part preconceived or directed at the time by the temporary bias of one leading intellect; that is one thing. It is another thing to return alone, day after day, to the many workings of a great mine; to scan, by the light of a single candle, the momentous problems of vein phenomena. While not wishing to put muscular geology into the foreground, I maintain that he who climbs thousands of feet, over snow and rock slides, to an abandoned prospect, in order to determine points ill understood, may speak with more authority than he who contemplates the view from the beaten trail. The silent peak, where human environment no longer intrudes, affords a better vantage point for accurate gauging of the diagram of nature, than does the rear platform of an observation car.

It appears excusable for one whose views have been attained in field work, frequently in regions hostile to human control, to protest when he finds subsequent investigators disregarding or misinterpreting his observations, ballasting the literature of ore-deposits with high-worded theories, and building hypotheses on unverified statements relating to parts of the world which they have never seen.

EMERALD MINES IN COLOMBIA.

United States Consul-General A. M. Beaupré, of Bogota, under date of April 29, 1903, sends a copy of the conditions prescribed by the Government for the presentation of bids and for the leasing of the Muzo and Coscuez emerald mines. These mines, the property of the Colombian Government, are to be leased to the highest bidder, the proposals to be received by the Government on December 31, 1903. To be admitted as a bidder, it is required:

1. Not to be in debt overdue to the National Treasury, the fact to be established by a certificate issued by the treasurer of the Republic.

2. To produce the sealed proposal addressed to the Minister of Finance before 10.30 a. m., December 31, 1903.

3. To add a certificate of the treasurer-general stating that the bidder has deposited in the National Treasury in American gold or in drafts on London, Paris, or New York, payable, at most, after 30 days' sight to the order of the same treasurer, and backed by a respectable bank in Bogota, or by receipts from the Credit Lyonnais, London Bank, or Uuion Bank, if the bidder is a foreigner, the amount of $50,000 required as a guaranty against bankruptcy.

4. To present a signed statement, accepting, without any restriction whatsoever, the stipulations set forth in these presents. The minimum monthly rent shall be $30,000 American gold for the ten years' lease. Proposals which do not cover this amount shall not be admitted. At all times the Government reserves itself the right to inspect the mines, in order to prevent damages, and the liberty to declare the contract null and void by reason of said damages. The Government may occupy, on its own motion, said mines without applying to the judicial authorities and even by having recourse to force.

THE TESTING OF BUILDING STONE.

By Edwin C. Eckel.*

Though cement and stone are closely related structural materials, the study and testing of their properties have taken curiously divergent courses.

The subject of cement testing has for many years been of great interest to both engineers and cement manufacturers, and much attention has been paid to devising methods which would best bring out the structural value of the material. Through the efforts of powerful engineering and trade societies, both general tests and methods of manipulation have become fairly well standardized, and it is now possible to compare, within certain limits, results obtained by different workers and in different laboratories. The German Association of Portland Cement Manufacturers has done much in this direction, while in the United States the American Society of Civil Engineers has taken the lead in the standardization of physical tests of cement, and the Society of Chemical Industry is at present engaged in securing uniformity in the methods of chemical analysis. The testing of cement, as compared with that of building stone, has, of course, the advantage that information gained by tests can be applied to the methods of manufacture so as to avoid, in future, defects which may have been detected.

The testing of structural stone has, in the meantime, taken an entirely different course, and with less satisfactory results. Though earlier contributions to the study of the subject had been made, the work of Gen. Q. A. Gillmore twenty-five years ago may be regarded as the foundation on which the modern study of building stone testing has been based. The accuracy of certain of Gillmore's conclusions may be questioned, but the real value of his work cannot be minimized. Physical methods of testing building stone have advanced but slightly since his day.

Since the time of Gillmore's work, however, another phase of the subject has been studied. The principal recent investigations have been made, not by engineers, but by geologists; and these have been concerned with the durability, rather than with the strength of the material examined. This fact has exercised a very appreciable influence on the course which the study has taken. Any present-day report on building stones, whether it be a private report on individual quarries or a public report issued by Federal or State geological surveys, will be found to show the influence of the classic work of Hawes, Merrill and Julien, as embodied in the "Report on Building Stones," which forms Vol. 10 of the Tenth Census.

The result of the division of the subject between geologists and engineers has been that little attempt to secure uniformity of methods has been made by any of the engineering societies which alone are strong enough to carry out such an attempt. This unsatisfactory condition, which prevents comparison of the results obtained in different laboratories, is due in large part to the complexity of the subject, and in so far can be obviated only by further work. It is due in part, however, to the conditions under which previous investigations have been carried on, and to better these united effort is essential.

It would appear desirable that this subject be taken up by one or more of the American engineering societies, which alone possess sufficient influence to make any proposed series of tests the standard. In one way, indeed, it will be easier to secure uniformity in this branch of investigation, for testing machines capable of handling a stone cube are much fewer in number than are the smaller machines used for testing cements.

Crushing Strength.—It has often been pointed out that no stone which an engineer is likely to use will ever fail by crushing, for even in such massive masonry structures as the Washington Monument and the Brooklyn Bridge piers the compression per square inch at the base is much below that which even a relatively weak building stone will bear. It is pointed out, moreover, that though a small test piece of a given limestone may fail by crushing at, say, 12,000 lb. per square inch, every natural exposure of the rock proves to us that in larger masses it is practically uncrushable. In spite of these facts, the test most commonly carried out, when quality of a stone is in question, is that for crushing strength.

Even though this test be unnecessary, it could, if carried out uniformly, give us certain information of value, and be a means of comparing the strength of different stones. Unfortunately, however, there is at present little uniformity in the matter. The apparent "compressive strength per square inch," as shown by any given stone in the testing machine, is known to vary with the shape of the test piece, its size, and the character of the bearing surfaces; but sufficient experiments have not been carried out to determine the laws of these variations.

In the matter of size of test piece, Gillmore's earlier experiments seemed to prove that a large cube gave higher compressive resistance per square inch than a small cube, and he constructed a formula showing the variation in compressive strength in relation to size of cube. This formula will frequently be found quoted in engineering and geological treatises, though within a year of its announcement Gillmore had determined, from the results of a longer series of experiments, that the so-called law did not hold true. Humphrey's recent experiments, discussed later, bear on this point.

Regarding the shape of test piece, it has been determined that a prism whose height is 1½ times the width of its base will give far more accurate results than the cube. This determination has had little effect on testing practice, however, the cube being employed as heretofore.

Probably the most interesting series of building stone tests reported[1] during the year was that carried on by Mr. Richard L. Humphrey. The tests in question were made for the purpose of ascertaining the quality of the stone used in the retaining walls and abutments in the Pennsylvania Avenue Subway, in Philadelphia. Six types of stone were tested, which are described as follows:

1. Leiperville Stone—A light-colored gneiss from Chester, Delaware County, Pa.

2. Rittenhouse Stone—A dark-colored gneiss from Germantown, Pa.

3. French Creek Granite—A very dark, close-grained, heavy syenite from the falls of French Creek, Chester County, Pa.

4. Conshohocken Stone—A medium-colored hard mica-schist, from Conshohocken, Montgomery County, Pa.

5. Clearfield County Stone—A medium-colored, hard sandstone from Curwensville, Clearfield County, Pa.

6. Lumberville Stone—A light-colored quartzite from Lumberville, Bucks County, Pa.

It will be noted that except in the case of No. 1 the 2-in. cubes uniformly gave higher results per

Results of Tests.

No.	Location.	Kind of stone.	Wt. per cu. ft.	Sp. gr.	Absorption.	Average crushing strength. 2 inch cube. Bed.	2 inch cube. Edge.	8 inch cube. Bed.	8 inch cube. Edge.
1	Chester, Pa.	gneiss	165.71	2.69	0.385	6,097	5,446	9,505	6,426
2	Germantown, Pa.	gneiss	176.23	2.825	0.135	19,891	15,555	11,636	13,984
3	French Creek, Pa.	granite	190.46	3.085	0.155	19,997	14,348	17,274	7,910
4	Conshohocken, Pa.	mica schist	177.76	2.91	0.155	20,038	15,680	10,417	7,532
5	Curwensville, Pa.	sandstone	146.00	2.40	2.335	10,218	8,013	7,513	4,463
6	Lumberville, Pa.	quartzite	158.19	2.63	0.998	no test	no test	14,841	8,637

* United States Geological Survey, Washington, D. C.

[1] *Transactions*, American Society of Civil Engineers, vol xlviii, pp. 506-507, 563-571, 1902.

square inch than the 8-in. This is directly contradictory of Gillmore's first statement of the matter, while in the light of later experience we might expect the results from both sizes to be approximately equal. Perhaps the abnormal results obtained may be explained in the supposition that, in any given mass of stone, the smaller the specimen the more likely it is to be homogeneous and free from cracks or other defects.

It will also be noted that the 8-in. cubes from Germantown, Pa., gave higher results when tested on edge than on bed—another abnormal result.

Transverse Strength.—Little attention is usually paid to testing the transverse strength of building stones, except in the case of stones intended for use as flagging, lintels, etc. This neglect is the more curious because building stone, in actual construction, often fails under transverse strain, as may be seen in the walls of many buildings. In theory, of course, a building should be so constructed as never to subject its wall material to anything but a direct compressive strain. In practice, however, the case is very different. Owing to bad masonry work, or more generally to the unequal settlement of foundations, transverse strains do frequently occur, and their effect is shown by vertical cracks in the poorer or weaker stones of the walls.

Hardness.—The resistance of stone to mechanical wear is rarely of sufficient importance to justify testing, when the stone is used strictly as a building material. Flagging, steps and sills are, however, subjected to considerable wear, and it is possible that some simple abrasion test might be of service. The only structural stone, however, that really fails, owing to mechanical wear, is serpentine, which is entirely too soft to be used in any unprotected situations.

Expansion.—It has long been recognized that much of the lack of durability of building stone is due to the effects of changes of temperature. These operate to disintegrate the stone because, except in the case of an entirely homogeneous material, the various component minerals will have different ratios of expansion on heating, as in a granite, while in sandstones the cementing material and the enclosed grains or fragments may expand unequally.

The tendency of a stone to exfoliate or disintegrate under changes of temperature can obviously be tested directly, and uniformity in the method of applying the test may be obtained without difficulty.

Absorption.—Changes of temperature, as indicated in the last paragraph, may of themselves cause serious injury to a stone; but when taken in connection with the action of water contained in the pores of the stone, the effect is greatly augmented. The tests applied for expansion are mainly to determine the effect of alternate heating and cooling, and particularly of high heating and rapid cooling. The tests for porosity or absorption, on the other hand, are carried out with a view to determining the probable resistance of the stone to the action of frost. Other things being equal, it is obvious that the stone which absorbs the greatest quantity of water, per cubic inch, in a given time, will be the stone that is subject to the greatest injury at low temperature owing to the freezing of the water contained in it

The action of frost is frequently simulated by using in the absorption test, instead of pure water, a saturated solution of some salt, of which expansion, on solidifying, would tend to crack or disintegrate the stone. Tests of this type have, however, fallen largely into disuse.

Chemical Tests.—In regard to uniformity in analytical methods marked progress has been made during the past few years. Dr. W. F. Hillebrand has described[2] in great detail the methods of rock analysis followed in the laboratory of the United States Geological Survey, and it seems probable that future progress in the standardization of such methods will follow closely along the lines of his paper. The analysis of materials for the manufacture of Portland cement, a subject which necessitates discussion of analyses of limestone, has been reported[3] upon by a committee of the Society of Chemical Industry, and a further report on the same subject will soon be presented. If followed by chemists engaged in industrial work, the methods advocated in the two papers noted will result in greater accuracy in determining the chemical composition of rocks, as well as greater uniformity in the statement of results.

The practical value of a chemical analysis depends largely on the type of rock in question. In the case of a granite, trap, or other crystalline igneous rock, an analysis is of itself of little service, though it may do some good if taken in connection with a careful microscopical investigation. With sandstones, analyses are somewhat more useful, in determining the character of the cementing material, though even here a microscopical investigation will probably be more serviceable. The value of a chemical analysis is greater in the case of limestones and slates, particularly the latter.

The actual attention which is paid to the analysis of a commercial stone may be inferred from the following case. A New York firm quarrying road metal on a large scale, utilizes a limestone which analyzes[4] about, SiO_2, 10 per cent; $Al_2O_3 + Fe_2O_3$, 3 per cent; CaO, 29 per cent; MgO, 16 per cent; CO_2, 41 per cent. This, it will be seen, is the analysis of a dolomitic limestone, and is a fair sample of the material actually quarried. An official report, however, quotes the following analysis of their material: SiO_2, 63.24 per cent; Al_2O_3 and Fe_2O_3, 19.52; CaO, 3.80; MgO, 1.29; CO_2, 2.72; alkalies, etc., 9.43 per cent. The point of greatest interest about this analysis is that it is quoted in an official publication which might be regarded as authoritative, and quoted, apparently, without the slightest suspicion on the part of the compiler that the composition represented by the analysis would be somewhat unusual for a limestone.

Microscopic Examination.—The examination, under the microscope, of thin sections of a stone serves to determine the characters and condition of the component minerals, the shape and method of aggregation of the individual grains; and, in the case of non-igneous rocks, the character of the cementing material. Microscopic examination, therefore, is perhaps the most valuable single test; but it is the one which can least readily be applied by the quarryman or engineer, as instruments and training are rarely obtainable.

Field Examination.—The examination of old buildings, and of natural exposures of the stone under test, are valuable aids to a determination of its probable durability. Field examination requires, however, a good knowledge of the geological history of the area in which the quarry occurs, as the degree to which a natural exposure of the stone has disintegrated will depend not only on the character of the stone, but on the length of time it has been exposed to the weather. Rock areas in New York and New England are rarely weathered deeply, as this district was swept clean during the Glacial period, while rocks of similar type in the Southern States may be covered by from 50 to 150 ft. of material resulting from their own disintegration.

CARRYING OIL IN BURMA.—According to *Indian Engineering*, the Flotilla Company runs six steamers, each with two flats alongside, between Yenangyaung and Rangoon. These boats carry no passengers and no other cargo than oil. They touch at no towns or villages on the trip, anchoring in the stream where they may happen to be at sundown. They remain only a few hours at the termini, where loaded flats at Yenangyaung or empty ones at Rangoon are usually awaiting their arrival. Though they run through some of the most mosquito-haunted parts of the Irrawaddy delta, no mosquito is ever found on board one of these oil steamers.

[2] W. F. Hillebrand. Some principles and methods of rock analysis. *Bulletin*, 176, United States Geological Survey.

[3] Report of the sub-committee on Uniformity in analysis of materials for the Portland cement industry. *Journal* Society of Chemical Industry, vol. 21, pp. 12-30.

[4] E. C. Eckel. "Quarry Industry in Southeastern New York." *Twentieth Report*, New York State Geologist, p. 174.

AMERICAN INSTITUTE OF MINING ENGINEERS.

A circular from the secretary's office, dated June 10, announces that the eighty-fifth meeting of the Institute will be held at New York, in October, 1903. Further particulars will be given in later circulars.

With regard to Mr. Andrew Carnegie's offer to give $1,000,000 to erect a building in New York for the use of the different engineering societies—the particulars of which have already been given in our columns—the circular states that action has been taken as shown below:

After repeated informal conferences of the members of the governing bodies of the several organizations named, and of committees appointed by said bodies, the following preamble and resolutions were unanimously adopted by the Council of the Institute June 4, 1903:

"*Whereas,* Mr. Andrew Carnegie, a member of the Institute, has offered the sum of about $1,000,000 to erect a suitable building for the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the American Institute of Mining Engineers, and the Engineers' Club of New York City;

"*Now, therefore, resolved,* That the Council of this Institute extends to Mr. Carnegie a cordial and grateful recognition of his generous offer, and will do all in its power to secure the attainment of his wise and beneficent purpose and the participation of this Institute therein;

"*And whereas,* It is understood that the said offer of Mr. Carnegie, though made to all the organizations above named, will hold good for any which may accept it, and it is desirable to ascertain, at the earliest possible time, which of the said organizations will unite in accepting it;

"*And whereas,* This Institute, as such, has not the power to hold real estate (except that real or personal property can be held by a trustee for its use and for the purposes which the Institute is organized to promote) and could not be incorporated without very considerable delay, and, even if it had or should acquire such power, it would be inadvisable that it should become tenant in common with other organizations of any real estate, by reason of the complications which might ensue upon the dissolution or insolvency of any one thereof;

"*Now, therefore, resolved,* That the American Institute of Mining Engineers will unite with the other organizations above named, or any of them, to accept the offer of Mr. Carnegie, to the full extent to which the same can now be done by this Council.

"*Resolved,* That upon the completion of the proposed building upon the site on the north side of Thirty-ninth Street the offices of this Institute be removed to such building; and the Institute will accept and occupy in said building such space as may be assigned to it by a joint committee, which shall consist of an equal number of representatives from each engineering society participating in the said gift of Mr. Carnegie, and will pay, in lieu of rent, its share of such annual expense for interest on the cost of the land, maintenance, repairs, heating and lighting, etc., of said building as may be reasonably assessed upon it by the said joint committee or any equivalent managing board hereafter created, with the approval of the said representatives of the Institute, which share shall be based on the amount of space assigned to the Institute as compared with that assigned to the other organizations.

"*Resolved,* That the title to the said building shall not be held by the organizations uniting in the acceptance of Mr. Carnegie's gift as tenants in common, but shall be held by another corporation, or by trustees, in such manner that the building may continue perpetually to serve the purpose of its munificent founder.

"*Resolved,* That for the purpose of ascertaining and determining the details mentioned in the resolutions already adopted by this Council, and for all further conference on said details with the representatives of the other organizations concerned, the present conference committee, heretofore appointed by this Council, consisting of Messrs. A. R. Ledoux, Charles Kirchhoff and Theodore Dwight, is hereby continued and authorized to represent this Council in all matters within its power on this subject; and the said A. R. Ledoux, Charles Kirchhoff and Theodore Dwight are hereby authorized to act as the representatives of this Institute as members of any joint committee, board of trustees, incorporated or otherwise, that shall have charge of the design, erection and maintenance of said building, under such rules and restrictions as may be determined by the Deed of Trust, the said trustees, or the joint committee of management that may be appointed by the engineering societies which are beneficiaries under

this trust; *provided*, that the Council may at any time appoint a substitute for any member of said committee, or discharge said committee and appoint a new one.

"*Resolved*, That the secretary is authorized to append to the minutes of this meeting such statement as may be prepared on this subject by the individual members of this Council present at this meeting; to send the same for individual signature to all members of Council not present at this meeting, and record with the minutes of this meeting the names of those who sign the same; and subsequently to submit the same by circular to the members and associates of the Institute, and to invite their opinion thereon."

In accordance with the rules the secretary announces that the amendment to Rule III, proposed at the New Haven meeting, October, 1902, and approved at the Albany (annual) meeting of February, 1903, has been duly adopted by postal ballot of all members and associates, and that the life membership fee will be hereafter $150, instead of $100, as heretofore.

HOISTING SIGNALS FOR MINES.

The following code of signals for hoisting in mines has been approved by the Western Federation of Mines, for all mines west of the Missouri River and in British Columbia:

Hoisting Signals.—One bell, hoist; one bell, stop (if in motion).

Two bells, lower cage.

Two bells, to put cage on or off the chairs.

Three bells, hoist men to surface.

Two bells, pause, then one bell, lower to next level.

One bell, pause, then two bells, hoist to next level.

Four bells, blasting signal. Engineer must raise the cage or bucket a few feet and lower it again to show his attention, then one bell, hoist men from blast.

Five bells, turn on steam.

Six bells, shut off steam.

Seven bells, turn on air.

Eight bells, shut off air.

Nine bells, danger signal (case of fire or other danger), then ring station signal where the danger exists. No person shall ring any signal bell except the station tender, except in case of danger, or where the main shaft is being sunk.

Special Signals for Sinking.—Three—two—one bells, when the cage is at surface, send down empty cage.

Three—two—two bells, send down drills.

Three—two—three bells, send down picks.

Where electric bells are used in connection with other bells:

Bells.	Pause.	Station Bells. Bells.	No.	Station.
2	"	1 pause	2	100
2	"	2	2	200
2	"	3	2	300
2	"	4	2	400
2	"	5	2	500
3	"	1	2	600
3	"	2	2	700
3	"	3	2	800
3	"	4	2	900
3	"	5	2	1,000
4	"	1	2	1,100
4	"	2	2	1,200
4	"	3	2	1,300
4	"	4	2	1,400
4	"	5	2	1,500
5	"	1	2	1,600
5	"	2	2	1,700
5	"	3	2	1,800
5	"	4	2	1,900
5	"	5	2	2,000

If cage is wanted, ring station signal. Station tender will answer one bell.

Reply, one bell to go up.

Reply, two bells to go below.

If station is full of ore, and station tender is wanted, ring station signal and do not answer back.

Two—one—three bells are rung, engineers or station tender does not understand, repeat signal.

In case of danger or accident, ring station signal, station tender will reply one bell, ring nine bells.

One copy of this code should be posted on the gallows frame, and one before the engineers.

A POINT IN CONCENTRATION.

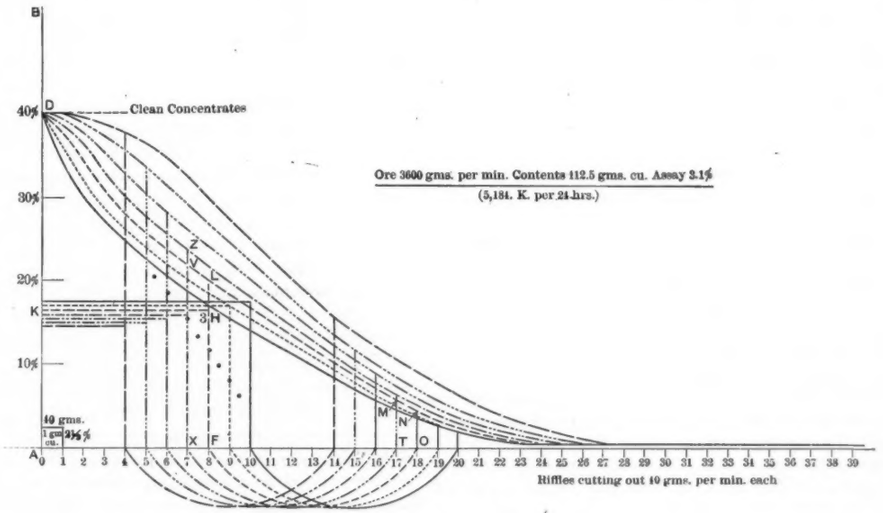
By M. A. KNAPP.

The enclosed diagram was drawn to explain a point I wished to make, in an argument with a friend, on the action and proper handling of the modern style of concentrators (such as the Bartlett, Wilfley, Standard, Overstrom, etc.) in which middlings are returned to be reconcentrated. Thinking it might be of interest to other concentrator men, I have written the explanation of the diagram, with some additional notes. This may be going over old ground, but possibly there are others besides myself, who have seen nothing written which calls attention to the particular points brought out here.

The diagram is to represent the effect of cutting out concentrates and middlings at seven different points, on a table which is handling a low-grade copper ore carrying 3.1 per cent of copper.

Distances on the line A-B represent assays in copper. Distances on the line A-C represent amounts of ore, middlings or concentrates, coming off the table; each division indicates 40 grams per minute, irrespective of width necessary to pass that amount. Point A is the upper edge of concentrates. From A to C there are only 40 such divisions; but these must be considered as representing only the upper 40 per cent of the material coming off the table.

Changing from			(gms. of cu.) Tailings gain.			Portion of part cut out staying in concentrate.
No. 10	to	9	15% of 6.	=	0.9	5.1 gms.
No. 9	to	8	30% of 7.	=	2.1	4.9 gms.
No. 8	to	7	45% of 8.4	=	3.8	4.6 gms.
No. 7	to	6	60% of 9.9	=	6.0	3.9 gms.
No. 6	to	5	75% of 11.5	=	8.6	2.9 gms.
No. 5	to	4	90% of 14.	=	11.8	1.4 gms.



A POINT IN CONCENTRATION.

	Concentrates. Weight per min.	Total contents gms. cu.	Cu. used to pay. Ft. & tr.	Cu. remaining as profit.	Middlings, 400 gms. Assay concen.	Contents.	Assay, % cu.	Tailings Wt. gms.	Cont. gms. cu.	Assay % cu.	Extraction %
Cutting at 10	400	95.0	70.0	25.0	23.75	30.0	7.5	3200	17.5	0.55	84.4
Cutting at 9	360	94.1	61.2	32.9	26.14	35.0	8.7	3240	18.4	0.57	83.6
Cutting at 8	320	92.0	52.8	39.2	28.75	38.5	9.6	3280	20.5	0.62	81.8
Cutting at 7	280	88.2	44.8	43.4	31.50	45.0	11.2	3320	24.3	0.73	78.4
Cutting at 6	240	82.2	36.6	45.6	34.25	52.0	13.0	3360	30.3	0.90	73.1
Cutting at 5	200	73.6	30.0	43.6	36.80	65.0	16.2	3400	38.9	1.17	65.5
Cutting at 4	160	62.0	23.2	38.8	38.75	76.0	19.0	3440	50.5	1.47	55.1

The different dotted lines indicate the condition of concentration from seven different positions of the cutting-out finger; points 4 to 10. For example: When cutting out at Fig. 8 we cut 8 times 40 grs. equals 320 grs. per minute of concentrates. FO is the width of cut of the middlings, being 10 per cent of the material coming over the table. From O to C and beyond, all is tailings. Assay of the lowest grade concentrates coming off at F would be represented by F-L, or 20 per cent. Assays of concentrates coming from the different sections are marked by the curved line dotted similarly to F-L, and running from L to D.

If A-F measures the quantity of concentrates, and the assay is marked by the curve L-D, then the contents of the concentrates in copper are represented by the area of the Fig. AFLD. The small square is taken as unit of quantity, and is equal to the copper in 40 grs. of concentrates or ore, containing 2½ per cent copper, or equals 1 gr. copper. The contents of 100 gr. of middlings taken out per minute by the cut F-O are similarly measured by the Fig. FONL.

The plotting is done in the following manner: The curve D-L-N-C is the value curve at the time when we are cutting out, at F, the 8 divisions or 320 grs. per minute. We wish to change the cut to X, taking out only 7 divisions. We leave out then the Fig. XFLV from the concentrates, but only a portion of this is lost in the tailings. I have adopted an empyrical scale (not far from actual), shown in the table above diagram, which represents the amount of such quantity cut out, that is lost, and the amount saved. By this scale we lose 45 per cent of XFLV, or 45 per cent of 8.4 grs. copper, equal to 3.8 grs., and save in the concentrates cut out above X 55 per cent of 8.4 grs., equal to 4.6 grs. We therefore plot the curve DZ, and Fig. DZXA to include 4.6 grs. more than DVXA. Similarly we add to the corresponding tailings curve the amount of 3.8 grs. minus the value included in the space TONM, which is thrown into the tailings by our continuing to cut the same amount into the middlings, or 100 grs. per minute.

The rectangle AFHK represents the portion of the copper contents that go to pay freight and treatment charges on concentrates, leaving the area above KHLD, as the profit in grams of copper, on the concentrates per minute, with the cut at point F. These freight and treatment charges are less for high-grade concentrates than for low grade, and are so drawn

in the diagram. They do not include mine or mill expenses.

In the table below the diagram are shown amounts and values of concentrates, middlings and tailings for the 7 curves plotted in the diagram, and the percentage of extraction and profit in each case

From this table we see that the maximum profit is at cut (6), with extraction of 73.1 per cent, and weight of concentrates 240 grs. per minute, assaying 34.25 per cent copper. The lowest value of material put into concentrates in this case was that coming off table just at point (6), with an assay of 28 per cent. The assay value checked off to pay freight and treatment under these conditions was 15.5 per cent. We have thrown into middlings considerable concentrates that carried over this 15.5 per cent. That is, to get a maximum profit, we cut into the middlings not only material that will not pay to ship, but also considerable of the lower grade concentrates. On tables of the type we are discussing, we can always see and take samples of the poorest concentrates that we are cutting. The position of the cut should at all times be above the point where we get material that simply pays expenses; and how far above, experience with the ore will show. This, of course, accords with good business principles, as well as good concentration practice; such material as will pay but little above expenses should be thrown back into the middlings, to be re-concentrated, even at a considerable loss, in order to increase the resultant profit.

In case of crushing very coarse, it may happen that the larger grains of sulphides are rolled by the wash water, and come off the table at a point below the fairly clean concentrates. As it is nearly impossible to lose these heavy sulphides in the tails, we should neglect them in estimating the values of our poorest concentrates, and allow them to run into the middlings until there is such an amount of them that a portion will be forced into the concentrates, while the remainder continues around its cycle through the elevator.

The question as to the amount of middlings to be cut should be decided by sampling the material that comes off the table as the highest tailings. Since the increase of middlings 50 per cent in amount may cause a decided saving of material going into the tailings, and yet only decrease the output of the table 6 or 7 per cent, it should be done in case of a large loss in the upper portion of the tailings stream.

We have thus far been considering the case of an ore coming regularly to the concentrator at a certain speed and value. In practice even in the best regulated mills, there are variations, if not of speed of machine and water feed, certainly of value and character of ore. All variations necessitate a shifting of the point of cut-off. In the case discussed the loss by cutting one point too high is about the same as that occasioned by cutting one point too low. Consequently we should aim to cut at condition represented by point (6). In another case, it may be that a greater loss will occur by a high cut than by a similar low cut. We should then cut out at a point a little below the point giving, by test, the best results, to avoid loss by carelessness of millmen.

We have been considering the case of a single concentrator which re-concentrates its own middlings. An arrangement by which the middlings from several concentrators are elevated together, and fed to the tables, tends to equalize the variations in the character of ore as well as to allow cutting off the middlings from a table for a time, in order to clean a clogged pipe or sluice.

In the best arranged mills using concentrating tables which give a middlings product, this is fed to one or more tables, set to handle this material alone. Such an arrangement is a great advantage. The curve of values we would plot on our diagram in such a case, is approximately represented by the row of small circles. The line of demarkation between the valuable and valueless material on the table would be much more marked, and the curve of values would rise more abruptly.

We have, however, to remember, that lack of care in cutting out concentrates will cause us more loss in this case than formerly, if we attempt to cut out at the point which gives the best test result; for the variations of the mill and ore will cause very poor material to be thrown into the concentrates at times. It is therefore best to cut high, and make very clean concentrates on the tables receiving the ore from the batteries, throwing to the middlings table a considerable percentage of concentrates. This middlings table, receiving from the whole mill, will not be subject to such sudden changes in values of ore-feed as are the other tables; and it can be therefore more carefully handled. It should be arranged, of course, to re-concentrate its own middlings. The point of cut should be determined by the principles discussed above and figured on the diagram. The value curve for the middlings table will, however, rise more gradually than those of the ore tables; as the feed to this concentrator carries all the material whose concentrating coefficient approaches, but does not reach, that of the material we cut as concentrates.

While 10 per cent was marked as the cut of middlings from the ore in question, it would be bad practice to put one middlings table to handle middlings from ten tables handling such ore, because the middlings are much harder material to concentrate than the original ore. The better practice would be to use one middlings table to 5 ore tables.

In some cases it will be advisable to pass the middlings of this middlings table through a separator before returning them to the machine, as the values carried by them (that can be saved) are entirely in the fines. This plan will cut out a large amount of heavy coarse gangue, which goes into circulation through the elevator, and interferes materially with the good working of the concentrator.

In conclusion, I would wish to call attention to the fact, that, in all concentrators of the class mentioned, a careful watching, as well as assaying of the richest material cut into the middlings, or of the poorest cut into the concentrates, taken in connection with a statement of the net profits of the day's run of concentrates, will be of far greater advantage than the watching and assaying simply of the average concentrates produced each day by the mill. The variations in the value of the material at the cutting-out-point are much more marked than those of the total concentrate; and the millmen should be taught to watch this point carefully, to judge not alone from the colors of the ore stream, but by frequent pannings of the material coming over at the point of cut, to take their concentrates above a grade that careful testing has shown to give, on the whole, the greatest profit.

PROHIBITING THE USE OF PHOSPHORUS.—The German Reichstag has passed a bill forbidding the use of white or yellow phosphorus in match-making. The Minister of the Interior, speaking in favor of the bill, said that phosphorus not only caused necrosis three or four years after a workman had left a match factory, but that the disease thus contracted was hereditary, so that whole families were affected. So subtle were the effects that the bones were fractured without the person being even aware of the fracture at first.

POLONIUM.—Polonium is another newly discovered element, similar to radium. Polonium rays differ from radium rays inasmuch as they contain no cathode radiation. It has hitherto been assumed that polonium only emits canal rays—that is, positive ions suffering only slight deflection by a magnet and undergoing absorption easily; in other words, heavy particles of considerable momentum, but small free path. H. Becquerel has now discovered another form of radiation, of high penetrative power. Polonium appears therefore to possess two out of the three forms of radiation exhibited by radium, and only lacks cathode rays.

THE GERMAN POTASH SALTS INDUSTRY.

In recent years there has been a large increase in the production of potash salts in Germany, owing chiefly to the development of new properties as a result of the heavy demand from the fertilizer trade, particularly in the United States and Germany. The potash mines are situated at Stassfurt, and are closely controlled by the German Kali Syndicate, which regulates prices by fixing the production according to an agreement with the subsidiary works. Good dividends have been paid so far.

An interesting comparison of the production of crude salts is shown below for intervals of five years since 1882, in metric tons, of 2,204 lbs.:

	1882.	1887.	1892.	1897.	1902.
Rock salt .	141,338	201,962	292,984	288,035	.....
Carnallite .	1,059,300	840,207	736,751	851,272	1,727,672
Kieserite ..	4,658	14,186	5,782	2,619	1,821
Sylvanite .	.....	.....	32,669	84,105	188,821
Kainite, Hartsalz & Schoenite	148,477	237,629	585,775	1,012,186	1,332,521
Total ...	1,353,773	1,293,984	1,673,961	2,238,217	3,250,835

In addition to the above there have been small quantities of boracite mined, which, together with rock salt, are not now reported. The largest increase in production is noted in carmallite and kainit, which are extensively employed in the preparation of the concentrated salts for manufacturing fertilizers.

How the crude salts mined have been utilized is shown below, in metric tons:

	Carnallite & Rock Kieserite			Kainite & Sylvinite* (also Hartsalz & Schoenits).		
	For agricultural uses.	Making concentrated salts.	Total.	For agricultural uses.	Making concentrated salts.	Total.
1882 .	10,249	1,053,709	1,063,958	125,676	22,800	148,476
1887 .	30,892	823,500	854,392	173,786	63,842	273,628
1892 .	46,620	695,913	742,533	498,573	119,871	618,544
1897 .	63,701	790,190	853,891	964,105	132,185	1,096,290
1902 .	124,467	1,605,025	1,729,492	1,226,489	244,493	1,470,982

The quantities of concentrated salts marketed since 1884 were as follows, in metric tons :

			Sulphate Potassium-Magn'm.			
	Potassium chloride. 80%	Potassium sulphate. 90%	Cryst. 40%	Calc. 48%	Kieserite in blocks.	Potash manure salt. 38% pot.
1884	106,330	3,000	400	8,000	17,800	9,500
1887	130,000	10,528	500	6,285	24,018	8,163
1892	121,028	15,466	708	11,842	23,855	16,895
1897	158,863	15,403	922	7,415	25,669	23,042
1902	191,039	30,202	600	16,834	.....	.....

The kieserite and manure salts, as well as others not mentioned, show a total output for 1902 of 139,329 tons.

The consumption of pure potash in the United States in the past five years is calculated as follows, in metric tons

	1898.	1899.	1900.	1901.	1902.
Agriculture	5,166	5,085	6,659	7,614	7,431
Other purposes	638	410	740	733	796
Total	5,804	5,495	7,399	8,347	8,227

The world's consumption of pure potash in 1902 amounted to 32,575 metric tons, which compares with 34,325 tons in 1901, and 30,461 tons in 1900.

THE LARGEST OIL STEAMER.—What is believed to be the largest oil-carrying steamer afloat has recently been built at the Clyde shipyards for the Anglo-American Oil Company. The vessel is named *Narragansett*, and has a bulk-oil carrying capacity of 10,500 tons (73,500 bbls.), and about 1,500 tons of bunker room.

THE UGANDA RAILROAD.—According to Sir George Whitehouse, the manager and chief engineer of the Uganda Railway, with the exception of a few unimportant temporary bridges which will have to be replaced by steel structures, all being within 30 miles of the Lake terminus, the line from Mombasa to Fort Florence is completed. Trains now run through without change of carriage from the sea to the heart of Africa, a distance of 584 miles.

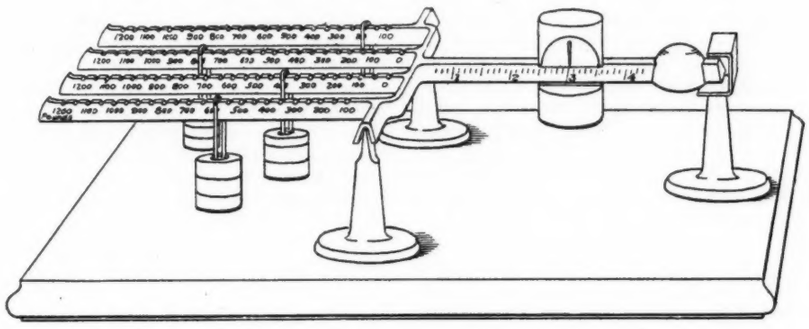
A DEVICE FOR ASCERTAINING AVERAGE SILICON IN A FOUNDRY IRON MIXTURE.*

By ARTHUR W. WALKER.

The device consists of a balanced scale, having a single beam on one side of the fulcrum, as shown in the sketch, and any number of beams on the other side; in the illustration there are four of these beams which are shown on the left of the supports. For the scale-beams on the left side, small weights are used, each weight representing a certain kind of iron, and the weight being varied to represent the percentage of silicon contained in the iron which it represents.

In the scale which we are using, each ounce in the left hand weights represent 1 per cent of silicon, and the weights can be arranged by adding weights of various amounts, so that they will correspond to the percentage of silicon in the various irons used, each weight representing one kind of iron.

Having arranged the weights in conformity to the percentage of silicon in the various irons, the weights are placed in position on the left-hand scale beams in accordance with the quantity of each iron which it is intended to use. The instrument we are using is designed for a net ton, or 2,000 lb. As shown in



BALANCE FOR DETERMINING SILICON IN IRON MIXTURES.

the sketch the weight on the front scale beam is set at 600 lb., indicating that for that particular iron it is proposed to use 600 lb. in a net ton. On the second beam the weight is set at 400 lb., indicating that 400 lb. of that iron will be used. On the next beam the weight is set at 800 lb., and on the rear beam the weight is set at 200 lb. It will be noted that these weights make 2,000 lb. in all. Having placed the weights in conformity with the proposed mixture, the right-hand weight is moved along the scale, until it balances the left-hand weights, and when the right-hand weight exactly balances the others, its position on the scale indicates the average silicon. From this may be deducted the expected loss in silicon (say 0.25 per cent) or the right-hand weight can be made to allow for this without any figuring whatever.

It is obvious, of course, that the instrument may be used in the opposite way from the above, setting the right-hand weight at the silicon desired, and then adjusting the left-hand weights until they balance, remembering that the total must always be 2,000 lb. for the left-hand weights.

If it is desired to ascertain the mixture in a charge larger or smaller than 2,000 lb., it is only necessary to change the large weight on the right-hand beam. In the device we use, this weighs 10 oz., and for a charge of, say, 1,200 lb., it would be changed for one weighing 6 oz.

There is, of course, no objection to placing two or more of the weights on the left-hand scale; indeed, a single scale on the left would serve for all the different weights used; it is thought that the use of a number of scale beams makes the device easier to use and understand.

This instrument can also be used to determine the average of any other element in the iron.

* Paper read before the American Foundrymen's Association, June, 1903.

THE FUNCTION OF GOLD.

Mr. Charles A. Conant holds* that the true function of gold in the monetary system is to serve as a store of value and the most exchangeable of commodities. He declared that while large transactions could be cleared against each other without the use of gold, yet in the long run gold must be employed as the final test of value, because it was the one thing desired above all other things, because it could always be exchanged for other things. Other things fluctuated in value according to their degree of exchangeability. This degree of exchangeability fell greatly where there was overproduction of goods, and it would be futile and unjust to take the values of goods, even over an average of time, as a proper measure of values. Gold money was the touch-stone of the needs for goods. If they rose in price in gold it was an indication of unsatisfied demand; if they fell in gold it was an indication of overproduction. Hence the exchange value of gold in relation to each other thing was the governor of production and determined the direction in which capital should be employed. It would deprive society of any accurate means of determining the proper direction of capital, and the necessity for increasing or decreasing production of given articles, if it should be attempted to replace gold by a system of averages intended to give uniformity to prices without regard to the relation of demand and supply between different classes of goods.

* American Association for Advancement of Science. Section I. "Is an Ideal Money Attainable?" by Charles A. Conant. Treasurer of the Morton Trust Company, New York.

LAKE SUPERIOR TRAFFIC.

The traffic to and from Lake Superior, which passed through the Sault Ste. Marie canals in May, exceeded that of any previous month on record; the total freight reported for the month being 5,188,017 net tons. For the season, from the opening of navigation up to June 1, there were 3,785 vessels passed through the locks, the total freight carried being 6,839,856 net tons, of which 1,763,849 tons were west-bound, and 5,076,007 tons east-bound freight. As compared with the corresponding period in 1902, the total freight shows an increase of 74,963 tons, notwithstanding the earlier opening of navigation last year.

The mineral freights included in the total were as follows, the figures being in net tons, except salt, which is in barrels:

	1902.	1903.	Changes.
Anthracite coal	96,521	238,847	I. 142,326
Bituminous coal	940,645	1,403,728	I. 463,083
Total coal	1,037,166	1,642,575	I. 605,409
Iron ore	4,458,312	4,024,205	D. 434,107
Pig and man. iron	24,734	18,905	D. 5,829
Copper	18,780	18,890	I. 110
Building stone	7,101	.....	D. 7,101
Salt, barrels	104,223	88,568	D. 15,655

The coal shipments this year have been large beyond all precedent for so early a date in the season.

NICKEL-STEEL RAILS.—We recently noted the orders for nickel-steel rails given by the Pennsylvania and the Baltimore & Ohio railroads. It is now stated that other orders have been placed by the New York Central for nickel-steel rails for use on the curve of the West Albany hill; by the Bessemer & Lake Erie and by the Union Railroad at Pittsburg. The New York Central and Bessemer & Lake Erie rails are about to be laid. Thorough tests will be made on these roads.

COPPER PRODUCTION OF THE WORLD.

We have received the circular issued by Messrs. Henry R. Merton & Co., of London, who estimate, in accordance with their custom for many years, the copper production of the world. The long experience of this firm and the great care exercised by them in making their estimates give a peculiar value to this statement, and we give the figures below, intending, however, to make some changes in the quantities given for the production of the United States and some other countries in our final statement. The estimated production of the different countries is shown in the table below in long tons of 2,240 lb.:

	1901.	1902.	Changes.	Per cent.
United States	267,410	294,600	I. 27,190	10.2
Canada	18,800	17,485	D. 1,315	7.0
Mexico	30,430	35,785	I. 5,355	17.6
Newfoundland	2,000	2,000	.....	....
Total North America	318,640	349,870	I. 31,230	9.8
Argentina	85	240	I. 155	182.4
Bolivia	2,000	2,000	.....	....
Chile	30,780	28,930	D. 1,850	6.0
Peru	9,520	7,580	D. 1,940	20.4
Total South America	42,385	38,750	D. 3,635	8.6
Austria	1,015	1,015	.....	....
England	532	600	I. 68	1.3
Germany	21,720	21,605	D. 115	0.5
Hungary	320	485	I. 165	20.2
Italy	3,000	3,370	I. 370	12.3
Norway	3,375	4,565	I. 1,190	35.0
Russia	8,000	8,000	.....	....
Spain and Portugal	53,621	49,790	D. 3,831	7.1
Sweden	450	455	I. 5	1.1
Turkey	980	1,100	I. 120	12.2
Total Europe	93,013	90,985	D. 2,028	2.2
Japan	27,475	29,775	I. 2,300	8.4
Cape of Good Hope	6,400	4,450	D. 1,950	30.4
Australia	30,875	28,640	D. 2,235	7.2
Totals	518,788	542,470	I. 23,682	4.6

It will be seen that, according to Messrs. Merton's estimate, the increase in the copper production of the world in 1902 was a very small one, the total being only 23,682 tons, or 4.6 per cent. That it was not larger was due to the decrease in some important countries, especially in Spain, Chile and Australia. In Spain there was a slight decrease in some of the principal mines, such as the Rio Tinto and the Tharsis, and a considerable falling off in the smaller mines. In Chile the decrease was chiefly due to the low price of copper, in 1902, which discouraged shipments of ore and matte from that country. The Australian reduction came chiefly from the unfavorable working conditions, resulting from lack of water and other drawbacks.

The large increase shown was in the United States, on which we have heretofore commented, and in Mexico. In the last named country, the production of the Boleo, which was formerly the chief item, was about stationary, but an increase was shown from the Greene and other new mines, which will undoubtedly continue. An unexpected increase is also shown in Norway, a large part of it coming from the Sulitelma mines, though some new mines also contributed a proportion. Japan showed a considerable gain, the Besshi Mine having recovered from the flood which interrupted its production in 1901. On the other hand, the Cape of Good Hope showed a decrease, the result of the damage done to the mines of the Cape Copper and Namaqua companies during the Boer war. In Germany the Mansfeld remains the chief producer and shows very little change in its output.

With the exception of Japan, North America is the only great division of the world which showed a gain last year.

COAL IN CHINA.—A recent report on the German colonies says that in China the railway has now brought the Wei-hsien coal-fields into direct communication with Tsingtau, and the first coal train reached that port at the end of last year. The Shantung coal has been tried both in the Government workshops at Tsingtau and on board ships

ABSTRACTS OF OFFICIAL REPORTS.

Ducktown Sulphur, Copper & Iron Company.

The report of this company for the year 1902, as issued from the London office, says: "There is a loss shown by the mines revenue account (owing almost entirely to the low price of copper ruling throughout the year and the enhanced price of fuel and other supplies) of £1,218, after debiting all working charges and cost of repairs, etc., and expenses of management at Ducktown, and after crediting £237 for interest received, and deducting all London management and other charges, providing for interest on debentures, the net loss is £6,424, which has been deducted from the amount, £8,970, carried over from 1901, leaving a balance of £2,546, from which has been paid a final dividend for 1901 of 2.5 per cent free of tax, amounting to £1,650; and a dividend of £1 13s. per share on the founders' shares, amounting to £330; a total of £1,980. This will leave a balance of £566 to be carried forward.

"The course taken by the directors last year in carrying forward a substantial sum as a precautionary measure, in the then uncertain and depressed state of the copper market, has enabled the loss incurred in the year to be borne without special strain on the company's finances, and the improvement in the copper market justifies the hope that a similar difficulty will not have to be met again in the near future."

Brunner, Mond & Co., Limited, England.

This is one of the largest concerns manufacturing heavy chemicals (soda ash, bleaching powder, etc.) in Great Britain, and judging from the profits, it is one of the best paying in the industry. In the year ended March 31, 1903, there was reported as gross trading profits £591,070, of which £396,479, or 67.1 per cent, was distributed in dividends, the ordinary shareholders receiving £342,222 (30 per cent, against 32.5 per cent in the previous year), and the preferred, £54,257 (7 per cent). Besides providing for sundry expenses the reserve fund has been increased by £125,000, making that account £850,000, which is equivalent to 43.2 per cent, of the capital stock of £1,967,519. The total assets are valued at £3,243,354, among which are alkali works, £1,807,974; land, salt works, etc., £567,750; stocks, steamers, etc., £371,616, and cash on hand, £28,224, the balance representing investments, patents and sundry debtors.

It is interesting to add that in the past six years the company paid dividends of £1,934,303 on its ordinary shares, being at the rate of 25 to 35 per cent per annum, and £308,090 on the 7 per cent preferred stock. The dividends on both shares amount to a total of £2,242,393, which is equivalent to 81.6 per cent on the gross trading profits of £2,787,972 since 1898.

As regards the future it is thought advisable by the directors to steadily increase the reserve fund, apparently with the view of meeting any further demoralization in the bleaching powder or other trades.

London & British Columbia Gold-fields.

This company's report for the year 1902, as issued from the London office, shows that the receipts from all sources—chiefly dividends on investments—were £29,020. Office and general expenses, taxes, etc., were £22,865, leaving a surplus of £6,155. To this is to be added £113,311, carried forward from 1901, making a total of £119,466. This sum is held to offset depreciation on shares owned by the company.

The directors' report says: "The very serious fall in the price of lead and silver during the period under review has had a disastrous effect on the company's large shareholding in the Whitewater, Ruth and Enterprise companies, and the assessment on the shares of the Ymir Company through its reconstruction involved a heavy liability to preserve this interest. The effect of this, and the delay in completing the Kettle River Power Company's works, makes it now necessary to provide additional capital to satisfy immediate liabilities, and to enable the directors to preserve the company's valuable assets. The Ymir shares and Kettle River debenture stock and shares have great prospective value, and the preservation of these assets alone would make it particularly desirable that some financial arrangement for this purpose should immediately be carried out. The recent developments in the Ymir Mine, not only add to the reserves which were represented by 72,350 tons at the end of December, 1902, but give values in excess of the average grade of ore treated during the years 1900 and 1901, when such large profits were made. In addition to these assets, however, the company's interests in the silver-lead properties belonging to the Whitewater, Ruth and Enterprise companies should be favorably affected by the recent and rapid appreciation in the price of silver, and also by the new legislation which it is hoped will be enacted by the British Columbian Government for an improvement in the conditions affecting the markets for the sale of lead.

"The following list of securities owned by the company is given: 52,473 shares of the Ymir Gold Mines, Limited; £36,417 in 6 per cent debenture stock of the Kettle River Power Company, Limited; 89,843 shares of the Kettle River Power Company; 38,641 shares of Whitewater Mines, Limited; 40,000 shares of Ruth Mines, Limited; 17,440 shares of Yukon Gold-fields, Limited; 63,248 shares of Enterprise Mines, Limited. The other assets of the company are represented by real estate in Nelson, B. C. (which comprises the buildings used for the offices of the company there), and the following properties: Alma Group, New York Claim, Mountain Belle Claim, Norfolk and No. 9 claims, and Ore Hill Group. The recent developments to the west in the Ymir Mine indicate that the Alma Group, which adjoins that property, may be of great value.

"In order to facilitate the dealing with the company's liabilities, the chairman, who was in New York at the latter end of last year on personal business, visited Montreal and spent several days in conference with Mr. Fowler, with a view, among other things, of disposing of some of the Kettle River debentures, but owing to the condition of markets in Canada and to the Crow's Nest coal strike and other causes, there has been no opportunity up to the present of doing this without undue sacrifice, but now that the Kettle River Company is actually supplying power to the towns, mines and smelters in the district, and is earning a revenue, the value of its debentures and shares is being rapidly enhanced.

"It is necessary, however, to at once provide funds for satisfying the company's immediate liabilities, to enable the directors to preserve the large number of shares which represent its principal assets, and after most careful consideration it has been decided to recommend that the company be reconstructed with a liability of 4s. per share, the payment of which will be spread over as long a period as possible. The directors having subscribed largely to the last issue of shares are themselves very large shareholders, and as such regret the necessity for the scheme now proposed, but they are prepared to provide their proportion of the assessment."

Wolverine Copper Mining Company.

The report of this Michigan company covers the year 1902. The total receipts for the year were $665,333. Expenditures, including construction, were $689,007, an excess of $23,674. The balance brought forward from 1901 was $540,142, leaving a balance of $516,468 at the close of the year. The mine is still in process of development, so that the payments for construction were large.

The total openings reported were 532 ft. shaft-sinking and 7,772 ft. levels and cross-cuts; a total of 8,304 ft. The stoping done reached a total of 11,351 fathoms. The rock hoisted was 213,650 tons. The rock stamped was 187,482 tons, yielding 6,232,800 lb. mineral, from which was saved 4,984,367 lb. copper; an average of 26.59 lb. per ton, or 1.33 per cent. The cost per ton of rock hoisted was $1.70; per ton stamped, $1.94.

Receipts and payments, with the averages per pound of copper, were as follows:

	Amount.	Per lb.
Sales of copper	$658,602	13.210
Interest	6,731	0.135
Total receipts	$665,333	13.345
Working expenses at mine	$364,093	7.304
Smelting, freight and selling	60,236	1.208
Working expenses	$424,329	8.512
Mine profit	$241,004	4.833
New construction	264,678	5.308
Excess of payments	$23,674	0.475

President John Stanton's report says: "It will be noted that the average price obtained for our copper was 3.53c. per pound less than in the previous year, causing a reduction in the value of the year's product of $163,069.46. The cost of production has been increased by the expenditure made in preparing to handle a larger output. The openings have been largely increased, and the shafts equipped with heavier rails, and larger skips, and put in condition to handle heavier loads, all of these expenditures being included in the working expenses.

"The amount expended in construction includes only the payments made on account of the new stamp mill and appurtenances, a new shaft-house, an additional compressor, new dwellings, etc.

"The rock stamped during the year averaged a little more than 600 tons per working day. The estimated capacity of the new mill is from 900 to 1,000 tons daily. A considerable increase in production may, therefore, be expected when the mill goes into commission, and it is believed that thereafter the cost of production of our copper will be in the neighborhood of 8c. per pound. The great delay by contractors in furnishing machinery for the new mill has been very annoying and has materially retarded operations."

BRINGING DOWN "HUNG" CHARGES.—A process for bringing down hung charges in blast-furnace or cupola work, or for cutting through any body of iron, steel, etc., was reported by Herr Menne at a recent meeting of the Verein Deutscher Eisenhuttenleute, at Dusseldorf, Germany. The process consists in using an oxy-hydrogen flame to heat rapidly a small spot of the piece, and when it reaches white heat shutting off the hydrogen, at the same time increasing the pressure on the oxygen, up to as much as 30 atmospheres. The burning of the iron by the oxygen rapidly makes a hole through the piece, and the high pressure blast blows the liquid material out of the hole, so that horizontal and vertical holes may be made with equal facility. Copper is not affected by this method, so that in a combination iron and copper plate it is possible to remove portions of the iron half without affecting the copper backing. The process is owned by the Koln-Musener Mining Company, of Kreuzthal, Westphalia.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

The Blue-print. Annual of the Engineering Society of the University of Nebraska. Lincoln, Neb.; published by the Society. Pages, 80; illustrated. Price, 50 cents.

Geological Survey of Alabama. Bulletin No. 7. Preliminary Report on a Part of the Water-powers of Alabama. By B. M. Hall. Montgomery, Ala.; printed for the Survey. Pages, 188; illustrated.

Refractometers and Some of their Uses in Chemistry. By W. F. Edwards. *The Development of Pseudomorphs.* By Horace B. Patton. Denver, Colo.; the Colorado Scientific Society. Pages. 24; illustrated.

Geological Survey of Canada. Contributions to Canadian Paleontology. Volume I, Parts 1 and 2. By Lawrence M. Lambe. Ottawa, Canada; Public Printer. Part 1, 96 pages; Part 2, 200 pages. Illustrated.

A Descriptive and Statistical Statement of the Gold Mining Industry of the Witwatersrand. Annexure to the Thirteenth Report of the Transvaal Chamber of Mines. 1902. Johannesburg, Transvaal; published by the Chamber of Mines. Text, 24 pages; with 34 diagrams.

United States Geological Survey, Division of Mineral Resources. Production of Aluminum and Bauxite in 1902. By Joseph Struthers. Pages, 12. *Production of Arsenic in* 1902. By Joseph Struthers. Pages, 12. *Production of Bromine in* 1902. By Joseph Struthers. Pages, 6. *Statistics of the American Iron Trade in* 1902. By James M. Swank. Pages, 52. Washington; Government Printing Office.

BOOKS REVIEWED.

The Story of "South Africa" Newspaper and Its Founder. Told by others. London, Eng.; *South Africa.* Pages, 188; illustrated.

This is a collection of articles from papers, letters and other material relating to the foundation of the paper known as *South Africa,* which is published in London as a special representative of the interests of the South African colonies. Incidentally, it contains also many interesting references to the history of those colonies and the progress of British interests in South Africa. The paper itself has always been a progressive one under the management of Mr. Ed. P. Mathers, its founder and director, and has done very much in presenting the interests of the colonies to the public, and in furnishing reliable information regarding their trade, industries and condition.

British Standard Sections. Issued by the Engineering Standards Committee, New York; the D. Van Nostrand Company. Nine plates with tables. Price, $1.

These standards were prepared by a committee acting jointly for the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Institution of Naval Architects, the Iron and Steel Institute and the Institution of Electrical Engineers. They give the standard forms and dimensions adopted for angle-bars, tees, bulb-angles, bulb-tees, bulb-plates, Z-bars, channels, beams and T-bars. The general form is shown by the plates and the accompanying tables giving the dimensions and thickness for different sizes of each kind of shape. With the backing of the technical societies named above, these forms will probably be adopted by practically all the British rolling mills. In this country, of course, they are serviceable mainly for purposes of comparison with our own usual standard forms.

Das Kaliberieren der Walzen. Eine Vollstandige Sammlung von Kaliberierungs Beispielen Systematisch Geordnet und Erlautert. By Prof. Alb. Brovot. In two Parts; each 32 pages text and 40 large tables. Leipzig, Germany; Arthur Felix. Price, for both parts (in New York), $9.75.

This book, or rather atlas of cuts, is a careful study of the preparation of rolls for rolling mills. It was originally prepared for a German technical paper, and is now published in book form. The plates are very carefully drawn and are sufficiently large—being about 9 by 16 ins. in size—to permit the insertion of full dimensions. They show the arrangement of rolls for successive passes in making girders, rolls, angles and shapes of all kinds. The accompanying text is itself illustrated by views of different forms of rolling mills, and also contains elaborate tables. The whole gives a very complete exposition of German practice in the preparation of rolls for rolling mills. It indicates also the principles upon which this practice is founded, and goes into some rather elaborate mathematical work in this connection. It will doubtless be valuable to all who are engaged in the manufacture of rolled iron and steel.

Ontario Bureau of Mines. Bulletin No. 5. Peat Fuel; its Manufacture and Use. Prepared by W. E. H. Carter, under supervision of Thomas W. Gibson, Director. Toronto, Ont.; Public Printer. Pages, 48; illustrated.

The Ontario Bureau of Mines has been for some time much interested in the possibility of producing a good fuel from the extensive peat-bogs which exist in some portions of the Province. The subject has been referred to, in several of the annual reports of the Bureau. Special interest was aroused last year by the scarcity of fuel consequent upon the anthracite strike in the United States, and the present report is therefore a timely one. This report sums up the information given in preceding publications of the Bureau, with the addition of much new matter. It contains a very good summary of the possibilities of the utilization of peat in Ontario. Included in this are the locations and brief description of the more important peat deposits; a summary of the work which has already been done in converting the raw peat into fuel; reports on the methods adopted in other countries, and on the machinery employed; analyses of peat; results of practical experience in its use, and an article containing analyses of peat-gas. Upon the whole, it is a valuable monograph upon the conversion of peat into a commercial fuel, as well as on the special conditions existing in Ontario. It will doubtless be of much service to operators in that province, and can be read with profit by those in other countries who are in a position to command supplies of this fuel material.

Annual Report of the Department of Mines of New South Wales for the Year 1902. Edward F. Pittman, Under-Secretary for Mines. Sydney, N.S.W.; Government Printer. Pages, 144; illustrated.

As usual, the New South Wales report contains, besides the statistics of annual production, many interesting particulars with regard to the different mining districts. The reports of the mine inspectors, which are appended, give very full statements as to accidents and as to improvements made in the mines and changes in mining practice. In addition to this, the Government geologist furnishes a report, a large part of which is devoted to artesian waters, and the results of mill borings made in different parts of the State. This is a matter of a great deal of importance in a country which has so recently suffered from severe drought.

The total value of the mineral production of New South Wales, in 1902, is given at £5,638,145. This was a decrease of £368,491 from the previous year, and this was largely due to interference with mining operations by lack of water. The more important items of the mineral production are gold, silver, lead, copper and coal, and gold and silver, showing a small increase in value, and copper a considerable decrease. Lead from the Broken Hill mines showed a large falling off in value, owing to the lower prices. The minor mineral products of New South Wales mines are quite numerous, although most of them are of comparatively small value, when compared with the chief items named above. Among them were antimony, bismuth, diamonds, opals, tin, zinc and oil shale. The operation of the coal mines was interrupted to some extent by labor troubles, and also by the increasing competition of Japanese and other coals with Australian coals in the far East.

The Copper Hand-book. A Manual of the Copper History of the World. Volume III; for the year, 1902. Compiled by Horace J. Stevens. Houghton, Mich. Horace J. Stevens. Pages, 600. Price, $5.

This is the third yearly volume of a useful manual which aims to cover the copper industry of the world. The introductory portion contains six chapters, one on the history of copper, one on the geology of copper, the third on the chemistry and mineralogy, the fourth on the metallurgy, the fifth on the uses of the metal, while the sixth is a glossary of mining terms. This introductory portion seems to us to be superfluous. It is impossible, in the space of 96 pages allotted to it, to give a full treatise on the very extensive list of subjects covered. It is too condensed, and omits too much, to make it of value, to miners and metallurgists, and its only object can be to give the non-technical user of the *Manual* a superficial idea of the subject, which is really of comparatively slight value. Following this begins the more important portion of the book. Eight chapters, 62 pages in all are devoted to condensed accounts of the copper deposits of the world. These are necessarily given in very brief form, but are still useful, and in succeeding annual volumes they can be made the means of giving brief accounts of new discoveries and important changes. They are, however, in need of some revision.

The bulk of the book, 405 pages, is devoted to a list of the copper mines of the world. These are arranged in alphabetical order, the statements giving the location, as far as possible, the extent of the property, with the officers and addresses. The compiler of this book has had long experience in the copper business, and has taken a great deal of pains in collecting the information given. It is more full in the present volume than in the preceding one, and is a long list of copper mining companies. In addition to the condensed information given above, the account of the more important mines includes a number of particulars as to their extent, property, while in many cases the figures from the annual report for 1902 are included. It is this section which gives the book its value, and makes it essential to all who are interested in copper mining or in the copper trade. The list of foreign mines might be improved, and doubtless will be, in succeeding editions.

The concluding section of 34 pages gives statistics of copper production in different countries, exports and imports of the United States, average prices and many other figures concerning the copper trade. A fairly complete index accompanies the book. It is, as we have said, a useful manual in a special field in which it has practically no competitor; and its present short-comings will doubtless be gradually eliminated.

THE CARD CONCENTRATOR.

The accompanying illustration shows a new form of concentrator, for which several advantages are claimed. It is of the Rittinger type, and the principal improvements consist in the use of channels, of a peculiar form, both longitudinally and transversely, instead of riffles, upon the surface of the table; in the method of feeding the pulp and in the mechanical movement, for actuating the table. The cross-section of these channels has the same obtuse angled bottom as the lower, operative corner of a miner's pan when in use.

Taken longitudinally, they are widest and deepest, on a line transversely of the table, about one-third the distance from the rear end; and both narrow and shoal from this widest and deepest part to each end of the table.

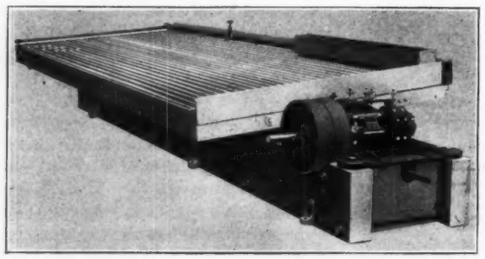
Beginning at the rear end of the table all the channels expand for substantially one-third their length. This portion of the table is a receiving and stratifying zone, the feeder being located just above it; while the forward two-thirds of the table area, in which the channels narrow and shoal, is the dressing portion. In the stratifying zone the interstices among the particles in the pulp are constantly enlarging, owing to the progressively increasing cross-sectional area of the channels, and stratification is so facilitated by this condition that the finest mineral particles settle very readily to the lower corners of the pan-shaped channels.

As the material arrested in the channels moves forward in response to the impulses imparted by the mechanical movement, it enters and traverses the dressing zone, where, as the channels both narrow and shoal, their cross-sectional area is correspondingly diminished. Their contents are progressively

raised into the cross-flowing dressing water, and the surface washed off layer by layer, without in any way affecting the substratum of mineral, which follows the channels up to and over the head of the table.

As the whole surface of the table is channeled, its entire area is operative, which results in large capacity, as to tonnage.

It is claimed that the channels on the Card table run even full of mineral and gangue, with the mineral at the bottom, presenting a smooth surface to the cross-flowing dressing water. The strata, overlying the longitudinal planes between the channels, are so shallow that the finely pulverized mineral easily reaches the bottom, follows the gentle slopes



THE CARD CONCENTRATOR.

of the upper sides of the channels down into the lower most corners, and there remanis until discharged over the head of the table; there being no eddies or counter-currents to impair the stratification, as on riffled surfaces.

Another arrangement, which promotes the saving of slimed mineral, is to pass the pulp through a small spitzkasten, then feeding the coarser underflow through the rearward compartment of the feeder and the finer overflow through the forward compartment, whereby the coarse mineral becomes a vehicle for carrying the fines up to and over the head of the table.

The three principal arrangements relied upon to carry the concentrates over the head ends of the various machines, are a continuous movement in one direction (as in vanners and buddles), the bumper and differential mechanical movements. The latter are, as a rule, of two classes, those depending upon a time differential, and those depending on differentials in velocities, as an accelerated forward and a retarded rearward movement in each stroke.

In the Card movement these two differentials are used in combination, so as to produce a compound motion, accelerated during the forward stroke, quick reverse to a retarded rearward stroke, terminating in a brief interval of rest, while at the same time the rearward stroke is made in less time than the forward one.

This combination, the inventors claim, gives the strongest possible forward impulse to the mineral on the table.

This form of concentrating table was devised by W. L. Card and F. G. Card, and is made by the Hendrie & Bolthoff Manufacturing Company, of Denver.

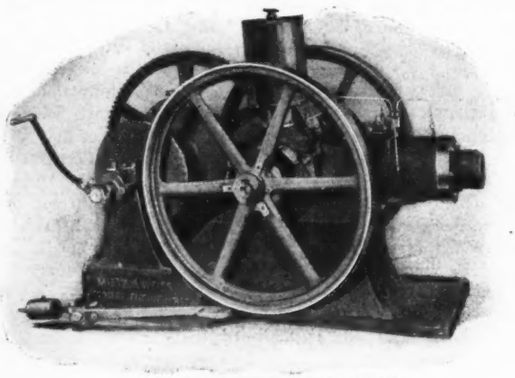
ALCOHOL AS FUEL IN OIL ENGINES.

Some interesting tests were recently made by Mr. C. W. Weiss at the Mietz & Weiss Engine Works, in New York, with cheap alcohol, made in Cuba and Brazil, as fuel. This alcohol was used in a standard oil engine made at the works named, the object being to test the possibility of substituting alcohol for oil; the former being much cheaper and more readily obtainable than oil, in Cuba and in some South American countries, to which many of these engines are being exported.

The results were entirely satisfactory. It was found that a mixture of 4 pints Cuban alcohol and 2 pints of water developed four horse-power for one hour. The specific gravity of the mixture was 0.9, that of the pure alcohol used being 0.794. The proportion of alcohol in the mixture must be varied, however, with the quality of the material; it is limited by the practical degree of compression prior to combustion in the engine.

The development, it is believed, will be of considerable importance in the matter of producing power cheaply in Cuba, and in Brazil and other South American countries. It would also be of importance in the Philippines where a cheap grade of alcohol is made, which can be furnished at a very low price.

The accompanying illustration shows a combined



OIL ENGINE AND HOIST.

oil engine (or alcohol engine) and hoist made at the Mietz & Weiss Works. This is a compact machine and should be very convenient for small mines and prospecting operations. It is made in sizes from 2 to 20 h.p. The engine is readily managed, and requires very little attention. While in operation it can be quickly stopped and started, and needs only a very small quantity of water, as water is only used for cooling purposes, and can therefore be used over and over again. The fuel consumption in this engine is very low. The arrangement is such the engine receives an impulse at each turn of the crank-shaft; the air and fuel injection, the compression and burning of the mixture, and the expulsion of the exhaust being all performed at a single turn. The crank-shaft is carried in rigid bearings and thoroughly lubricated, while it is completely covered, excluding the dust and dirt. The valve motion is extremely simple, requiring little attention and few repairs.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

LIABILITY OF MINE OPERATOR FOR FAILURE TO NOTIFY EMPLOYEE.—A mine employee in blasting with powder of a certain explosive quality does not assume the risk incident to the substitution without notice to him of a powder of a higher explosive quality and more dangerous character; he having the right to rely on his employers' performance of the duty of notification.—Chambers v. Chester (72 *Southwestern Reporter*, 904); Supreme Court of Missouri.

LIABILITY FOR NEGLIGENCE IN OPERATING BLAST-FURNACE.—Where one operating and maintaining a blast furnace, from which molten iron and other material are liable to be thrown without warning from the mouth of the furnace, had provided a screen in front of the opening, but the screen had not been replaced after its removal in order to make repairs, and an employee was injured by molten metal thrown out of such furnace opening, such failure to have the screen replaced constituted negligence sufficient to justify a recovery for such injuries.—Curtis v. McNail (73 *Southwestern Reporter*, 167); Supreme Court of Missouri.

RIGHTS OF SURFACE OWNERS AND EXTRALATERAL VEINS.—Where one has title and possession of the surface, containing apices of veins extending under the surface owned by and in possession of another, the former under the law of the United States (Revised Statutes, section 2322) establishing the rights of locators of mineral locations and declaring that they shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations and of every vein the top and apex of which lies inside of such surface lines extended downward vertically, though the veins in their course downward may extend outside the vertical side lines of such surface locations must be deemed the owner and in possession of all parts of such veins, notwithstanding the presumption in favor of the others title to everything beneath the surface.—Montana Ore Purchasing Company v. Boston & Montana Copper and Silver Mining Company (71 *Pacific Reporter*, 1005); Supreme Court of Montana.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

The Sugartown Platinum Works.

Sir.—We wish to call your attention to the following item, which was published in your issue of June 6: "The Sugartown Platinum Company, of Malvern, Pa., has begun the erection of a new brick plant. Joseph B. Mattack is president."

This is not a correct statement of the facts. We are aware that, through the publication of an item, in a local paper, similar to that contained in yours, a number of journals have copied it, with the result we have received a large number of communications, improperly addressed. In fact, some people, to whom our firm is known, have written to the Sugartown Platinum Company, believing it to be an entirely different concern. You can readily see the confusion this has caused, and we would ask that in an early issue you make the correction.

There has been no change whatever in the style of our firm, and the name of J. Bishop & Co., which has been so long known, being the oldest manufacturers of platinum wares in this country, will be continued. We are now building new works, which we hope to occupy in a few weeks in Malvern, in which we shall have the best appliances and with improved methods of manufacture, will be better equipped to meet the requirements of the users of platinum.

You may recall that we were burned out in January last, our old works at Sugartown having been completely destroyed. Of course, we do not attach any blame to you for the inaccuracy, but would ask that you make the correction.

J. BISHOP & CO.

Malvern, Pa., June 12, 1903.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Topaz.—Can you tell me if there is any market for topaz by the ton? I refer to topaz, as commonly known—$(AlF)_2 SiO_4$—the orthorhombic mineral. The topazes can hardly be called gems, in the sense that they are precious stones, though the crystallization is perfect in many cases. They can be collected by the ton in some localities.—A.

Answer.—We do not know of any market for topazes in large quantities. The material might find some use as an abrasive, provided it could be delivered at small cost. Otherwise, the commercial value is rather uncertain.

Alum and Sulphate of Alumina.—Can you suggest any literature on the manufacture of alum and sulphate of alumina?—P. P. N.

Answer.—In recent years the alum industry has expanded noteworthily, as a result of the increased demand in the textile, paper and other trades. Doubtless another cause has been the larger supply of such raw materials as bauxite in this country, which has helped to decrease the cost of manufacturing these important chemicals. In "The Mineral Industry," Vol. III, page 25, *et. seq.*, Mr. John Eneuist has given a valuable dissertation on the subject, which contains, among other data, analyses of the raw materials that are most important in the manufacture of alum and sulphate of alumina. At various times short articles have appeared in the ENGINEERING AND MINING JOURNAL and elsewhere, but the paper referred to above is undoubtedly the most complete.

Stibnite.—Will you kindly advise me who buys stibnite in car-lots?—J. M. P.

Answer.—Considering the increasing demand for antimony as an alloy for other metals and for manufacturing chemical compounds there should be no trouble in finding a market for good quality stibnite. The buyers of crude ore, however, are few, and in the United States Matheson & Co., of 25 Cedar Street, New York, have practically a monopoly in smelting. The trade in metallic antimony is less restricted, as there are a number of importers, who, it should be said, are obliged to pay a duty of 0.75c. per lb., while the ore can be imported free. There is some demand for the ore for export. Buyers for this purpose can be found in the advertising pages of the ENGINEERING AND MINING JOURNAL. You might also correspond with the chemical manufacturing firm of John C. Wiarda & Co., of Brooklyn, N. Y., who are buyers of stibnite to some extent. The value of the ore will depend upon its freedom from impurities.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending June 9, 1903.

730,218. MOLDER'S LADLE.—Winfield S. Anderson, Cincinnati, Ohio. In a molder's ladle, the combination of a handle, a circular pot-holding band thereon, which is open and has its separated ends overlapping, perforations in these ends adapted to receive a locking-pin

730,228. EXCAVATING APPARATUS.—James G. Bump, Brad, Tex. In an excavating apparatus, the combination of a revoluble mast, winding-drums carried thereby and revoluble therewith, a master-wheel, and gears including reversing devices, connecting the master-wheel to the mast, so that the latter may be driven in either direction without reversing the direction of rotation of the master-wheel.

730,229. SEPARATOR.—Jesse T. Burr, Glenville, Ohio. A separator for separating a mass of matter into component portions composed of particles of like or approximately equal specific gravity, consisting of a longitudinal hollow body, having a base formed of a series of upwardly-inclined planes inclined at angles slightly exceeding the critical angles of the material and presenting extended frictional surfaces in planes intercepting at small angles the line of movement of the material under the force of the current and separated at their ends from one another so as to form escape-outlets between adjacent planes, an inlet for the mass of material adjacent to the lowermost inclined plane, and means to induce a current of fluid upward through said hollow body over said inclined planes.

730,233. CASING OR TUBING ELEVATOR.—Kenton Chickering, Oil City, Pa. In a casing or tubing elevator, the combination with a clamp comprised of a plurality of pivoted jaws and means for locking the same, said jaws having converging inclines on their interior, of a plurality of wedge-shaped serrated slips or wickers for each jaw, said slips or wickers concentrically arranged and movably connected with their respective jaws.

730,244. GUIDE FOR ROLLING-MILLS.—Victor R. Edwards, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass. A guide for rolling-mills, consisting of a frame provided with a chamber for guide-plates, a pair of recessed guide-plates substantially filling said chamber in one direction, and adjustably in the opposite direction, a screw-threaded opening in the wall of said chamber and communicating therewith and having its diameter substantially equal to the diameter of said chamber, and a screw held in said opening with its end bearing against one of said guide-plates.

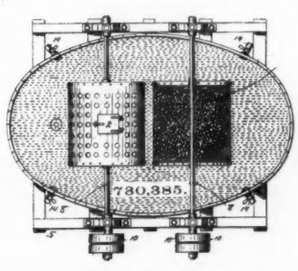
730,272. WELL-BORING MACHINE.—Andrew Kopperud, Milwaukee, Wis. In a well-boring machine the combination of a rotary jaw-carrier provided with radially-movable jaws and levels connecting said jaws so that the adjustment of one will produce a like and simultaneous adjustment of the others.

730,274. INGOT-CASTING APPARATUS.—Horace W. Lash, Cleveland, Ohio. Apparatus for casting ingots comprising a mold having a runner entering at the bottom, and a shear-bar under the mold in proximity to the runner, adapted to be moved to sever the runner.

730,280. ORE OR DREDGING BUCKET.—Robert J. Mefford, Toledo, Ohio. The combination, in a hoisting-bucket composed of two parts, of a shaft forming a common pivot for said parts, a series of pulleys and a drum mounted on said shaft, two sets of shafts secured within said parts, pulleys mounted on said shafts, cables secured to said drum and engaging with and extending upward from the pulleys on one of said sets of shafts, a superimposed transverse bar, a set of cables attached to each of said parts, each of said sets adapted to engage with the pulleys on the remaining shaft on the opposite part to which said cables are attached and with the pulleys on said pivotal shaft and extend upward and be attached to said transverse bar.

730,288. PROCESS OF MANUFACTURING SAFETY-EXPLOSIVES.—Adam McCracken, Dunedin, New Zealand. A method of manufacturing an explosive compound which consists in dissolving picric acid in glycerine, adding thereto infusorial earth, then adding an aqueous solution of nitrate of potash, boiling the mixture, adding a small quantity of sulphur thereto, and finally thoroughly drying the same.

730,385. APPARATUS FOR THE PRECIPITATION OF METALS FROM SOLUTIONS.—Peter W. McCaffrey, Denver, Colo., assignor to the Union Ore Extraction and Reduction Company, Denver, Colo. In apparatus for the precipitation of dissolved metallic values, the combination of a tank adapted to hold the solution to be treated, and



a perforated receptacle containing scrap metal, the perforated walls of the said receptacle being composed entirely of the same material, said receptacle being partially immersed in said solution and mounted to rotate therein, whereby the solution is made to circulate through the scrap metal.

730,340. WELL-DRILLING MACHINE.—Charles Butterfield, Haxtun, Colo. The combination of a supporting-frame, a derrick at one end of said frame provided at its top with a pulley adapted to support a drill-cable, a winding-drum for said drill-cable, a guide-pulley arranged to the rear of said drum for the passage of said cable, a walking-beam pivotally mounted on said frame forward of said winding-drum and guide-pulley and provided on its upper surface with a cable-engaging pulley, operating mechanism for said walking-beam comprising a pitman pivoted to the free end of said beam, a pair of parallel gears, and a pin connecting said gears and passing through said pitman, a driving-shaft, pulleys mounted on said shaft, a pair of gears mounted on said shaft and in mesh with the gears to which said pitman is connected, and clutch mechanism between the driving-shaft and the gears mounted thereon comprising a plurality of internally-disposed ratchet-teeth in the hub of said gears and a plurality of pawls mounted on said shaft and adapted to engage with said internal ratchet-teeth.

730,402. ROPE-SHEAVE SUPPORT AND ADJUSTMENT FOR ROPE-TRAMWAY TOWERS.—Byron C. Riblet, Spokane, Wash. In an adjustable tower for aerial wire-rope tramways, the combination with the standards, the cap, and the struts, of bolts depending from each of the ends of said cap, an eye in the depending end of each of said bolts, an axle extending through the eyes of said bolts, a rope-sheave operatively mounted on the outer ends of each axle, bars attached to the support for said sheaves, and an eye in the free end of said bar, by which it is pivotally secured to said tower.

730,414. UNION CABLE AND DRILL-TOOL SOCKET.—Elwin Strickland, Los Angeles, Cal. A combined cable and drill-tool socket provided with escapement devices actuated solely by the unlaying and relaying of the drill-cable.

730,418. PICK-HANDLE.—Ezra O. Thompson, Kirkville, Iowa. A pick-handle provided at its upper end with a surrounding shell or ferrule secured in place by bolts or rivets and formed with a solid head having a countersink adapted to pass through the eye of a pick and with a lateral rib or projection to contact with an sustain the pick, a threaded extension central of the countersink, and a T-shaped nut adapted to be secured upon the threaded extension and to bridge the eye of the pick.

730,448. CONVEYER.—John Fern, Scranton, Pa. A main conveyer, auxiliary conveyors radiating from the main conveyer, a flexible shaft by which the auxiliary conveyers are driven, the said parts being so arranged that the auxiliary conveyers may be moved longitudinally of the flexible shaft.

730,460. APPARATUS FOR REMOVING DRILL-TOOLS FROM WELLS.—Frederick G. Irvine and John B. Braden, Salem, W. Va. The combination with a casing adapted for endwise-reciprocatory movement, of a grab to be lowered into the casing, and having means for interlocking the grab with the casing and also with a drill-tool to provide for simultaneously reciprocating the latter with the casing to loosen the tool and to draw it out of the well by manipulation of the casing.

730,462. PROCESS OF TREATING ORES.—Edward D. Kendall, Brooklyn, N. Y. A process which consists in mixing pulverized auriferous magnetic with pulverized auriferous pyrite and subjecting the mixture to heat without the oxidizing action of air.

730,467. LIMEKILN.—Peter Martin, Huntingdon, Ind. In combination, in a limekiln having a furnace which includes a fire-chamber, of a water-reservoir, a pipe leading therefrom through the dome of the furnace adjacent to the door of the fire-chamber, said pipe having its discharge-orifice directed toward the grate of the fire-chamber, and a steam-supply pipe also leading through the dome of the furnace adjacent to the door of the fire-chamber with its discharge directed toward said grate and arranged to direct a spray which will intercept the discharge from the first-mentioned pipe.

730,479. MANUFACTURE OF ARTIFICIAL STONE.—John T. Saltiel, Denver, Colo. A composition consisting of crushed granite, powdered or fine-crushed glass, sand grit, clean hard cinder-clinkers, pebbles, hydraulic cement, ochers, rain-water, suet or tallow soup, crushed egg-shells boiled in vinegar, acetic acid and water in or about the proportions specified.

730,480. PROCESS OF MAKING ARTIFICIAL STONE, ETC.—John T. Saltiel, Denver, Colo. A process of proofing and strengthening artificial stone, brick, tile and plasters, which consists in dampening the mixed dry ingredients thereof with water in which has been stirred a liquid mixture consisting of warm water, acetic acid, fat soup and egg-shells and vinegar which have been boiled together.

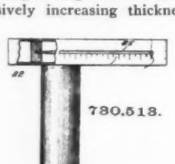
730,495. COMPRESSING SYSTEM.—Carl W. Vollman, Montreal, Canada. The combination with a compression-cylinder having supply and exhaust ports and a piston reciprocating therein, of an auxiliary supply of high-pressure fluid to said cylinder and means for varying the time of said auxiliary supply relatively to the movement of said piston.

730,503. CRUSHER AND PULVERIZER.—Milton J. Williams, St. Louis, Mo., assignor to the Williams Patent Crusher & Pulverizer Company, St. Louis, Mo. In a crushing and pulverizing machine, the combination with a casing, of disintegrating means therein including a plurality of pivoted beaters and operating means therefor, each beater comprising a shank, a head formed with a socket to receive the end of said shank and oppositely-disposed pockets opening into said socket and means in said pockets for securing the head to the shank and for regulating the weight of said head without changing the position of the head on the shank.

730,506. PAINT AND PROCESS OF PRODUCING SAME.—Cushing Adams, Bellows Falls, Vt. A paint composition,

consisting of a mineral base, casein, an alkaline substance, lime and alum.

730,513. PYROMETER.—Eugene Childs, Boston, Mass. In a pyrometer, a casing having a hair-line, a transparent glass body of progressively increasing thickness, said glass be-


730,513.

ing movable relative to the casing and of a neutral tint to transmit light-rays of any color with equal facility, and a scale having markings correspondingly to the points on the transparent body, at which the light-rays, due to a certain predetermined temperature, become invisible when looked at through said glass body.

730,539; 730,540 and 730,541. CONVEYER.—Samuel F. Joor, Morgan Park, Ill. In a conveyer the combination with an endless chain disposed approximately in a vertical plane, and supporting a driving means therefor, of a series of buckets carried by said chain, each of said buckets being provided with a hinged cover adapted to automatically open on the lower run of the conveyer-chain, and when thus opened to serve as a chute for the charging of the bucket with its load.

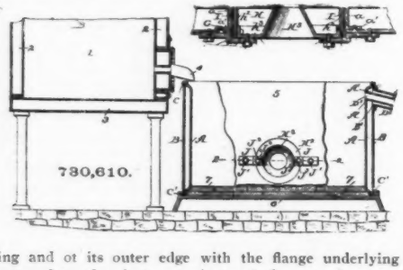
730,554. MACHINE FOR CONVEYING, TRIMMING AND TRANSFERRING COAL, ETC.—John McBride, Sr., Philadelphia, Pa. A truck provided with means of propulsion in either direction, in combination with a framing and an inclined chute and bearing supported on said frame, and an arbor bearing sprocket-wheels and inclined endless chains provided with slit elastic hooked scrapers arranged to raise commodities in said chute.

730,558. EXCAVATING APPARATUS.—Gordon McKay, Newport, R. I. In an excavating apparatus, a scow or float moored for swinging movement, a chain and bucket excavating device carried thereby, excavator-operating mechanism, mechanism for imparting a side feed to the scow, a single motor for operating both said mechanisms whereby the side feed of the scow has a definite relation to the operation of the excavator, and friction driving devices between the motor and said mechanisms so constructed as to operate the same under normal conditions but to slip and allow them to remain inactive when undue resistance is made.

730,589. CENTRIFUGAL PUMP AND COMPRESSOR.—Carl W. Weiss, New York, N. Y. A centrifugal pump-section, comprising an outer wall or shell, a chamber-wall supported by said shell to direct the fluid toward a central discharge-opening, inclined webs supported by said chamber-wall, a partition-plate carried by said webs and having its periphery separated from said shell by a narrow annular space, said webs extending from the chamber-wall to the partition-plate.

730,600. MANUFACTURE OF COMPOSITIONS FORMING IMITATIONS OF STATUARY-MARBLE.—Leonce Beaumel, Toulouse, France. A process of forming artificial stone or marble, consisting in first dissolving alum in water and heating the same to boiling-point, then adding a solution of sulphate of baryta, then subjecting the whole to evaporation to increase its density, then cooling the same under constant agitation, until it assumes a pasty consistency and finally allowing the mass to harden.

730,610. SMELTING-FURNACE.—Edward Campbell, Rossland, Canada, assignor of two-thirds to Alexander G. Street and John James Campbell, Rossland, Canada. The combination in a receiver for use in connection with smelting-furnaces, of the inner and outer plates spaced apart forming the water-jacket and provided with an opening for the tapping-jacket, the inner plate being provided with an outwardly-projecting wing surrounding said open-


730,610.

ing and of its outer edge with the flange underlying the outer plate, the rivets securing such flange and outer plate together, the tapping-jacket fitting in the opening in the side of the receiver, and composed of the inner cup-shape section having a central opening, and the outer section having an outer plate provided with an edge flange threaded into the outer end of the cup-section and also provided with an inwardly-tapering central tube threaded in the central opening in the cup-shape section and means for securing the tapping-jacket in connection with the body of the receiver

730,630. MANUFACTURE OF WHITE CEMENT.—Otto Friz, Nuremberg, Germany. The process of manufacturing white cement consisting in preparing a mixture of lime and clay, both as free as possible from iron, with porcelain frits and burning said mixture approximately to the fusing-point.

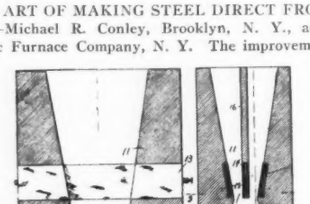
730,631. GRINDING-MILL.—Clinton C. Fusmer, McKinley, N. Y. A grinding-mill comprising a base-plate having at each end pulley-openings, separate and independent horizontally-arranged U-shaped yokes resting upon said base, shafts journaled in said yokes and carrying at their inner ends separate and independent grinding-disks, said yokes having inwardly-beveled upper portions, and said base provided with adjusting-screws adapted to engage said beveled portions, substantially as described.

730,682. GOVERNING DEVICE FOR STEAM-PUMPS.—Robert B. McGowan, Cincinnati, Ohio. A pump-governing device, embodying a balanced throttle-valve divided into separate chambers each provided with a double series of perforations through the outer shell, said valve having its operating-stem extended as a piston-rod into a pressure-cylinder, and a piston upon the rod actuated in said cylinder in one direction by the resistance head or pressure, and in the other by an adjustable spring.

730,708. REVERSING-VALVE FOR FURNACES.—John W. Seigh, Johnstown, Pa. A water-cooled valve formed of two parallel and concentric shells of substantially D shape in longitudinal vertical section and approximately rectangular in transverse vertical section, said shells being secured directly together at their bases, the upper one of said shells having an opening therein extending entirely across the top thereof, provided for the passage of cooling water and means for directing the overflow of water therefrom to the sides of the valve and preventing the flow of same over the ends thereof.

730,732. SLIMER ATTACHMENT FOR CONCENTRATING-TABLES.—Charles T. Arkins, Denver, Colo. The combination with a transversely-inclined concentrating-table having a vibratory movement, of a receptacle connected with the lower edge of the table and relatively movable, the said receptacle having a mesh covering to receive the discharge from the table.

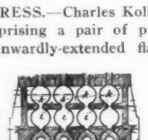
730,746. ART OF MAKING STEEL DIRECT FROM IRON ORE.—Michael R. Conley, Brooklyn, N. Y., assignor to Electric Furnace Company, N. Y. The improvement in the


730,746.

art of making steel from iron ore, which consists in mingling with the ore sufficient carbon to essentially combine with the oxygen of the ore when heated and pass off as carbonic oxide, and then melting the mass in an essentially-closed furnace by feeding it through a heated belt or zone of higher temperature than is obtainable in an ordinary blast-furnace to a retaining-hearth.

730,761. FORGE.—Rudolf Golze, Dessau, Germany. In a forge, a hearth-plate having a central tuyere and channels extending radially from such tuyere, the bottoms of the inner parts of the channels forming inclines, slides arranged in the said channels, and means for simultaneously moving the slides therein.

730,776. FILTER-PRESS.—Charles Kolb, Maxeville, France. A filter-press comprising a pair of pressure-plates having top and bottom inwardly-extended flanges provided with

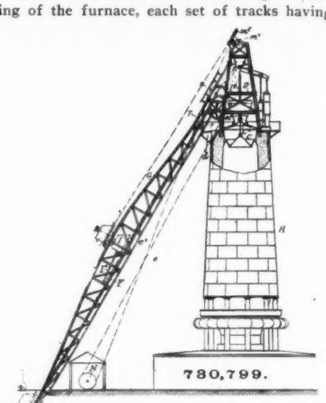

730,776.

semicircular recesses, the ribs between said recess being extended between the flanges and forming rectangular recesses, filtering-cloths on the inside of said plates and flanges, and horizontal bars separating said cloths at intervals in substantially the form of a series of tubes communicating at the sides.

730,778. MANUFACTURE OF TILES, SLABS, OR THE LIKE.—George Kunick, London, England. A process for the manufacture of tiles, slabs, bricks and similar articles, consisting in pressing to shape a mixture of sand and lime, indurating the articles by treating them with carbonic-acid gas and finally submitting them to a high temperature in a furnace.

730,786. DRILLING-TOOL.—Thomas Murphy, Allegheny, Pa. A tool comprising a shank embodying a series of integral frustro-conical sections each provided with a vertical groove or passage-way, and a bit formed integral with the lowermost frustro-conical section of the shank.

730,799. BLAST-FURNACE CHARGING APPARATUS.—Edwin G. Rust, Pueblo, Colo. In an apparatus for charging stock to a blast-furnace, etc., the combination of two sets of tracks one above another leading to the charging-opening of the furnace, each set of tracks having an inde-


730,799.

pendent discharge device with cars constructed to operate upon said tracks.

730,802. BEARING AND SUPPORT FOR UNIVERSAL MILLS.—Frank Seiling, Allegheny, Pa. A vertical roll, upper and lower bearing-boxes therefor with soft-metal linings extending entirely around the shafts of the roll, said shafts being eccentrically located within the lining, the thicker parts of the lining being in the rear part of the boxes, there being lubricant-slots extending through the front portions of the boxes and through the thinner portions of the soft-metal linings, removable closures for the slots, and mechanism for clamping the closures.

730,820. CONTINUOUS KILN.—Walter P. Grath, St. Louis, Mo. A continuous kiln comprising a plurality of chambers, each chamber having furnaces and an outlet-flue and a waste-heat flue, the waste-heat flue of each chamber communicating with bags arranged vertically alongside of the furnace-bags of the same chamber.

730,835. AMMONIA-CYANIDE PROCESS OF TREATING COPPER, NICKEL, OR ZINC ORES CONTAINING PRECIOUS METALS.—David Mosher, San Francisco, Cal., assignor of one-half to David Beatty, Berkeley, Cal. A process of treating refractory sulphur, tellurium and arsenical ores containing copper, zinc, nickel, gold and silver, consisting; in first roasting such ores at a low, red heat to transform the metals so transformable into sulphates, arsenates or tellurates; then oxidizing reducing compounds by very dilute ammonia; and subsequently extracting the metals with an ammoniacal cyanide solution containing an excess of cupric oxide or hydroxide over and above that necessary to form metallic cyanide double salts.

730,842. CENTRIFUGAL PUMP.—Auguste C. E. Rateau, Paris, France. In a centrifugal pump, a main shaft, a series of one or more turbines carried by said main shaft, an inlet leading to said turbines and a discharge therefrom, in combination with a hollow spindle surrounding the main shaft, a second series of one or more turbines carried by the hollow spindle and arranged to receive the liquid discharged from the first series of turbines, a second discharge leading from the second series of turbines, means for controlling both discharges, and means for coupling and uncoupling the hollow spindle and main shaft.

Re-issue No. 12,117. ELECTRO-DEPOSITED LEAD.—Anson G. Betts, Lansingburg, N. Y. Original number 713,278, dated November 11, 1902. As a new product, electro-deposited lead characterized by substantial purity, coherency and uniformity of structure throughout, practically free from crystalline form and having substantially the homogeneity of cast-lead with a density of about 11.3, and retaining the normal structural characteristics due to electrolysis.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending May 23, 1903.

9,300 of 1902. NICKEL REFINING.—J. Dewar, Cambridge. In Mond's nickel carbonyl process for refining nickel, conducting the operation under atmospheric pressure so as to make the carbonyl compound more stable.

9,522 of 1902. CLEANING MINERS' LAMPS.—H. Davies, Glamorgan. Improved method of cleaning the glass and wire gauze of miners' safety lamps.

9,693 of 1902. TUBE MILL.—H. Walker, Misterton. Improved method of mounting tube mills on adjustable rollers in addition to the hollow trunnions.

12,859 of 1902. CONDENSING ZINC VAPORS. E. H. Hopkins, London. Condensing metallic zinc vapors by passing through carbon heated to 400-550° C.

3,308 of 1903. REFRACTORY BRICKS.—The Carborundum Company, Niagara Falls, U. S. A. Using carborundum as a binding material for silica and other oxides for making refractory bricks and crucibles.

4,209 of 1903. COAL-CUTTER.—A. Wilson, Leith. Improved type of variable feed gear for coal-cutting machines.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mr. B. S. Revett is again at Breckenridge, Colo.

Mr. Frank L. Sizer is in Colorado on professional business.

Mr. Simon Bamberger visited De La Mar, Nev., this week.

Mr. Patrick Clark, of Spokane, is in Siskiyou County, Cal.

Mr. H. A. Titcomb, of Denver, has gone to Europe on a holiday.

Mr. Henry F. May, of Denver, sailed by the *Germanic* on June 17.

Mr. R. J. Kerr has recently returned to San Francisco from Mexico.

Mr. J. Parke Channing, of New York, has returned from California.

Mr. Dennis Clark, of Spokane, has returned from Camp McKinney, B. C.

Mr. George H. Robinson, of Salt Lake City, Utah, is in New York on business.

Mr. Auguste Mathez has gone to examine mines in the State of Durango, Mex.

Mr. W. Rowland Cox is now manager of the Silver Lake Mine, at Silverton, Colo.

Mr. G. D. B. Turner, of Park City, Utah, has gone on a business trip to Scotland.

Mr. Lew Humphrey, of Central City, Colo., left last week for Sault Ste. Marie, Mich.

Mr. B. Thayer, of San Jose, Cal., has been visiting the Tomboy Mine at Telluride, Colo.

Mr. Harold Rickard and Mr. Ernest Levy have returned to Denver from Bingham, Utah.

Mr. C. M. Fassett, of Spokane, has been in Republic, Wash., to inspect the Bodie Mine.

Mr. Kennedy J. Hanley, part owner of the Skokum Mine at Wardner, Idaho, is in Spokane.

Mr. J. H. Cresswell, of London, passed through New York this week on his way to Bodie, Cal.

Mr. Harry Argall has been appointed assistant chemist at the Grant Smelter, at Denver, Colo.

Mr. Carlos Cadmus, the well-known Mexican mining engineer, spent a few days in Denver last week.

Mr. A. C. Beatty has removed his office from 221 McPhee Building to 226 Equitable Building, Denver.

Mr. John Stanton, of New York, has returned from a visit to the Granby Smelter, at Grand Forks, B. C.

Dr. Duchendorff, of Freiberg, Germany, is now in this country, investigating some metallurgical matters.

Prof. Mark Ehle, Jr., of the South Dakota School of Mines, is in charge of a party of students at Aspen, Colo.

Mr. Carl Riedt, of the Penoles Mining Company, at Mapimi, Mex., has been in New York for the past week.

Mr. W. J. Nelson, who has mining interests at San Andreas, Calaveras County, Cal., is in San Francisco, Cal.

Mr. R. S. Shaw, manager of the Thayer Gold Mining Company at Miramar, Costa Rica, is in New York City.

Mr. John C. Montgomery, of Denver, accompanied by Mr. Ernest A. Wiltsee, is at the Waldorf-Astoria, New York.

Mr. Walter H. Weed has resigned the position of consulting engineer to the Hays Mining Company, of Sonora, Mex.

Mr. Edgar A. Collins, lately of Telluride, left Colorado a few days ago for Parral, Mex., on professional business.

Mr. Hiram W. Hixon, manager of the Mond Nickel Company, Limited, in Ontario, was in New York this week.

Mr. Charles A. Molson, of Salt Lake City, engineer to the Exploration Company, of London, is in New York City.

Mr. Philip L. Foster, mining adviser to the Exploration Company, London, reached New York by the *Lucania* on June 6.

Mr. M. F. Leech has been appointed manager of the Elmore group of mines at Rocky Bar, Idaho, recently sold to Pittsburg people.

Mr. Charles W. Goodale, of Butte, has been in New York consulting with the directors of the Boston & Montana Copper Company.

Messrs. Charles A. Pringle, W. N. Vaile and C. S. Verrill sailed on June 13 by the *Caribbee* for Dominica, in the British West Indies.

Mr. Theodore E. Schwarz, of Denver, returned there a few days ago after a month's sojourn in Chihuahua, Mex., on professional business.

Mr. A. Burch, late superintendent of the Bunker Hill & Sullivan Mining Company, at Wardner, Idaho, is back to Spokane after a trip to Cuba.

Mr. Richard A. Parker, who was at Hot Springs, N. M., for his health, is visiting at Boston Highlands, Mass. Later he will visit Denver, Colo.

Mr. W. H. Wickham, of Denver, Colo., returned there a few days ago from Parral, Mex., where he had been professionally engaged for some time.

Mr. Robert T. Hill, geologist of the United States Geological Survey, has resigned to take a position with the Development Company of America.

Mr. P. Kirkegaard, manager of the mines and reductions works of the Canadian Gold-fields Company at Deloro, Ont., has been in New York City.

Mr. Charles H. Fulton, professor of Mining and Metallurgy, at the South Dakota School of Mines, Rapid City, will be in New York for several weeks.

Mr. Jay P. Graves, of Spokane, general manager of the Granby Consolidated Company, was at the company's works in Grand Forks, B. C., last week.

Mr. J. M. Long, formerly superintendent of the Le Roi Mine at Rossland, B. C., is now superintendent of the Yreka Coal Company, at Quatsino, B. C.

Mr. Frank Augustus, of Centerville, Ia., is now at Rollinsville, in Gilpin County, Colo., where he will look after the interests of the Mountain Monarch Mining Company.

Mr. W. H. Alexander, of Chicago, has been appointed business manager of the Majestic Copper Mining and Smelting Company, with headquarters in Salt Lake City, Utah.

Mr. Philip Argall, of Denver, and Mr. Chester W. Purington, of the firm of Doveton & Purington, left Denver on June 15 for a short professional trip to Nevada and Idaho.

Mr. Harry A. Lee, of the firm of Lee & Finch, mining engineers, of Denver, Colo., returned there a few days ago from New Mexico, and both members of the firm intend to leave shortly for the Black Hills on professional business.

Col. H. G. Heffron, formerly with the Bingham Consolidated Mining and Smelting Company, of Bingham, Utah, is now in the employ of the Gold Roads Company, of Mohave County, Ariz.

Prof. Lionel Torey, of the Russian Technical School, at Tomsk, Siberia, is now in this country investigating mining school courses, practical mining and mining machinery. He has been visiting the University of Wisconsin, and is now at the northern Michigan mines.

Prof. Robert H. Richards, of the Massachusetts Institute of Technology, leaves this week for a three months' trip to the important ore milling plants of the Pacific Coast. He goes out by way of the Black Hills and Spokane to Seattle. Mrs. Richards accompanies him, and they will visit the Yellowstone Park and Alaska en route to San Francisco. For July his address will be care of Miss Hammond, 1803 Fourteenth Avenue, Seattle, Wash.

OBITUARY.

Charles Frederick Dunham, 49 years old, a mining engineer for the last 10 years in Mexico, died at Montclair, N. J., on June 15 of heart trouble. Mr. Dunham was a large property owner, and was interested in several mines in Mexico.

Col. Frank Coxe, part owner of the extensive anthracite coal mines, of Coxe Brothers & Co., in the Hazelton region, Pa., died at his home at Charlotte, N. C., recently, from heart disease. Col. Coxe was 64 pears old. He leaves a widow and five children.

John Guth, a mining man of New York City, resident manager and one of the leading shareholders of the Banker Gold Mining Company, owner of the Banker Mine on Breece Hill, Leadville, Colo., died at Leadville on June 7. Mr. Guth was 69 years old. About four years ago he organized in New York and New Jersey a company to work the Banker Mine, and has since had charge of the work and visited the mine daily.

SOCIETIES AND TECHNICAL SCHOOLS.

COLORADO STATE SCHOOL OF MINES.—Members of the old faculty who have been re-engaged are Prof. H. B. Patton, chair of mineralogy and geology; Prof. Arthur R. Curtis, chair of drafting; Prof. Claud L. Filkins, chair of mechanics. Instructors who have been re-engaged are: Profs. S. Hazzard, Berry, Haldane and Test. The chairs yet to be filled are mining, metallurgy, physics, mathematics and electrical engineering.

AMERICAN CHEMICAL SOCIETY—NEW YORK SECTION.—At the meeting on June 5 the election of officers resulted as follows: Chairman, Prof. E. H. Miller (Columbia); vice-chairman, F. D. Dodge; secretary-treasurer, H. C. Sherman (Columbia).

These papers were read: Carl H. Zieme and M. T. Bogert, "The Preparation of Anisic Acid from Oil Anise"; H. C. Sherman and M. J. Falk, "The Influence of Atmospheric Oxidation Upon the Composition and Analytical Constants of Fatty Oils" (in abstract); J. L. Danziger and W. H. Buckout, "A Rapid Method for the Determination of Arsenic in Arsenopyrite" (in abstract); William Campbell, "On the Structure of Metals and Alloys" (Part III); P. A. Levene, "On the Chemistry of the Cell."

Speeches were made by Dr. Schweitzer, Dr. T. J. Parker and Mr. F. D. Dodge, closing the session of 1902-03.

INDUSTRIAL NOTES.

The Burt Manufacturing Company, of Akron, O., is making a shipment of oil filters to Australia.

The Acheson Company, of Niagara Falls, N. Y., intends soon to erect a plant for the manufacture of siloxicon.

The Holthoff Machinery Company, of Cudahy, Wis., is shipping mining machinery to the R. E. Briggs Company, Mexico City.

The Allis-Chalmers Company has placed a contract with the Commercial Electric Company for a large hoisting equipment for a Mexican mine.

The Sullivan Machinery Company, of Chicago, Ill., recently opened an office in the Missouri Trust Building, St. Louis, Mo., with P. F. Jarvis manager.

The John A. Roebling's Sons Company, of Trenton, N. J., with New York offices at 117-119 Liberty Street, made recently a shipment of copper wire to England.

At the annual meeting of the International Steam Pump Company the old board of directors was re-elected, Alfred Nathan was elected in place of James H. Snow, deceased.

The Acker Process Company, of Niagara Falls, N. Y., is erecting a stack 250 ft. high to carry off the chlorine gas generated in the manufacture of the company's products. The stack is being erected by builders from Chemnitz, Germany.

The Jones & Laughlin Steel Company, of Pittsburg, Pa., has completed foundations for a fifth Eliza furnace, to be 21 by 85 ft. The company has most of the equipment placed for four more Talbot open-hearth furnaces, each of about 1,500 tons per week capacity.

The Philadelphia Pneumatic Tool Company, of Philadelphia, Pa., reports a largely increased business in the Middle West, and has employed J. F. Ahern, formerly with the Scully Steel and Iron Company, of Chicago, to assist G. Hollingshead, the Western sales manager for the company in Chicago.

The Waterloo Mining Company, at Daggett, Cal., recently sold its big silver mill to Hofius, Chamberlain & Co., of Los Angeles. This mill contains 60 stamps, 27 amalgamating pans, and the original cost was over $150,000. The new owners will either move it to another place or offer it for sale.

W. W. Edward, of Los Angeles, Cal., has recently sold one of his 3-stamp mills, a New Standard concentrator, and two engines to the Ora Rica Mining Company, at Fenner, Cal. Mr. Edwards has also equipped the Wyndham Chief Mining Company, of Wyndam Bay, Alaska, with a 2-stamp mill.

The Edward Christman Company, of Massillon, O., has placed with the Cyclone Drilling Machine Company, of Orrville, O., an order for five complete drilling machines. When this order is completed, the Christman Company will have in operation 12 Cyclone drills. The company has many large contracts for testing coal lands.

F. R. Hazard, president of the Solvay Process Company, of Syracuse, N. Y., recently purchased 193 acres of land in South Chicago, Ill., for $437,250. A large by-product coke plant is to be erected, and 120 ovens built first. The capital backing the project is said to be closely allied with the Semet-Solvay Company, of Pittsburg, Pa.

The American Refractories Company, a combination of firebrick interests in the various districts of Pennsylvania and Ohio, is reported still under way. The consolidation, it was thought, would be effected in May, but some concerns, it is said, place too high a valuation on their works, so that of the 35 concerns intended for the consolidation there will be only 25 under the new arrangement.

Charles H. Besly & Co., Chicago, Ill., say that they have made recent shipments of Gardner grinders to New York, Pennsylvania, Ohio, Wisconsin, Michigan and California, and have received cablegram orders for several machines from Vienna, Austria. All departments at the Beloit, Wis., factory are busy, but difficulty is still experienced in obtaining the higher grades of tool steel.

The Stockton Iron Works, of Stockton, Cal., has recently built a large dredge for Reclamation District No. 551 with a bucket of 3-yd. capacity, and has under construction at its works three more dredges with buckets of 1, 2 and 3-yd. capacity, respectively. The firm has been building dredges for this class of work for over 20 years, and its dredges have a high reputation on the Pacific Coast.

A contract for extensive equipment has been secured by the Morgan Construction Company, of Worcester, Mass., from J. Monton, one of the largest steel and wire producers in France. The equipment is for installation in the St. Denis Works, near Paris, for a complete rod mill of 115 tons per 11-hour day capacity. The contract was secured through Julian & Kennedy, Sahlin & Co., of London, Eng.

The Pickands-Magee Coke Company, of Pittsburg, Pa., recently applied for a charter, capital $500,000. The company intends to buy and sell coal and coke, and to lease, mortgage and exchange coal and coke lands. The incorporators are W. C. Magee, of Pittsburg, Pa.; C. P. Wheeler, of Cleveland, Ill.; C. P. Poynton, of Chicago, Ill.; William M. Hall, Jr., and Watson B. Adair. W. C. Magee, formerly vice-president of the H. C. Frick Coke Company, is to be president.

Bids for boilers and generators for the new smelting plant of the Cerro de Pasco Mining Company, of Cerro de Pasco, Peru, are now being received by Frank Klepetko, of 8 Bridge Street, New York. Purchases so far made have been from the Nordberg Manufacturing Company, of Milwaukee, Wis., of 2 blowing, 5 blower and 2 dynamo Corliss engines, aggregating 4,000 h.p., from the P. H. & F. M. Roots Company, of Connersville, Ind., of 5 pressure blowers. J. B. Haggin is the financial backer of the enterprise. Contracts for auxiliary machinery and apparatus will be taken up later.

The F. M. Davis Iron Works Company, of Denver, Colo., has established a metallurgical department at 1737 Champa Street, Denver, where it is installing a complete ore testing plant, for testing ores of all characters in any quantity, up to car-load lots. The machinery, all driven by electric motors, will consist of crushers, rolls, stamps, Chile mills, amalgamating pan, jigs, hydraulic classifiers, chlorination barrels, cyanide tanks, screens, concentrating tables, Frue vanners, etc., also a complete assay office and laboratory for all necessary chemical work. It is the purpose of this department to design, erect and turn over in complete working order cyanide mills, chlorination mills, stamps mills and concentration plants. The department will be under the management of W. B. Milliken, of Denver, Colo., who has been connected with some of the largest metallurgical enterprises of the West.

The Dan River Power and Manufacturing Company will equip its mill at Danville, Va., with electrical machinery throughout, and for this purpose has recently ordered from the Westinghouse Electric and Manufacturing Company two 750-kw. and one 500-kw., 6,600-volt generators, together with two 125-kw. exciters, each generator to be direct connected to an independent waterwheel. The current is to be transmitted 3,000 ft. to a step-down transformer station, in which will be located four 600-kw. Westinghouse oil and water-cooled transformers, which will step down the 6,600 volts to aproximately 500 volts. From these transformers the current will be carried to a sub-station switchboard, from which lines will run through an underground vitrified conduit, transmitting the current to the various buildings, where it will be used for driving numerous Westinghouse, type "C" induction motors.

TRADE CATALOGUES.

The N. & G. Taylor Company, of Philadelphia, Pa., issues a little monthly publication which it calls *The Arrow*. Its aim is to call attention to the good qualities of Taylor Old Style tin sheets.

The Western Electrical Supply Company, of St. Louis, Mo., issues a little 24-page pamphlet, describing the high-grade transformers manufactured by the Maloney Electric Company. Attention is called to the high insulation, low temperature rise, and good regulation of these transformers.

In the literature recently published by the Westinghouse Electric and Manufacturing Company, of Pittsburg, Pa., are Special Publication No. 7005, a reprint of a paper "On Some Pertinent Features of a Modern Meter," read before the Ohio Electric Light Association, and Special Publication No. 7007 on "Westinghouse Type M and O-D Transformers."

The Ft. Wayne Electrical Company, of Ft. Wayne, Ind., issues an excellent series of flyers, bulletins and pamphlets. Flyer No. 4042 describes the B & B commutator trueing device for keeping commutators in perfect condition; flyer No. 4044 treats of Wood fan motors of the suspending, revolving and desk type. Circular No. 1039 is about Type MP, small direct-current generators; No. 1040 tells of motor-starting rheostats, and No. 1041 describes Type LB direct-current belted motors.

The Illinois Central Railroad has published a very artistic pamphlet with numerous colored illustrations calling attention to the comfort that may be had in traveling between Chicago and St. Louis by taking its "Daylight Special" train. The equipment of this train comprises a buffet library car, parlor car, complete dining car, free reclining chair car, and day coach, all having a general uniform general color scheme, and provided with every convenience for making railroad travel pleasant.

Bulletin No. 2, a pamphlet of 8 pages, published by the Allentown Rolling Mills, of Allentown, Pa., describes the Aldrich quintiplex electric pump. This machine consists of a slow-speed motor directly connected through single reduction gears to a horizontal quintuplex pump, and is intended for pumping cold non-acid water, against heads of 300 to 1,400 ft., the capacity varying from 900 to 140 gals. per minute. Among its merits are that the plungers are outside packed, the pump is sectional and is automatically lubricated. The details of construction are briefly described.

"Modern Labor Saving Apliances for Assayers and Chemists," is the title of an attractive 100-page pamphlet published by the F. W. Braun Company, of Los Angeles, Cal. The list of appliances includes blow-pipe outfits, hydro-carbon burners, laboratory crushers, cupel machines, ore-samplers and muffle crucible, melting and combination furnaces. The company states that having succeeded to the business of John Taylor & Co., of San Francisco, it carries at its San Francisco office at 34 Spear Street, a large and varied stock of assayers' materials, chemicals and school, scientific and laboratory apparatus and supplies. The pamphlet describes in detail the various special furnaces with hydrocarbon burners, and the other appliances which the company has manufactured with much success.

SPECIAL CORRESPONDENCE

Denver. June 13.

(From Our Special Correspondent.)

For the first week in June the gold receipts at the United States branch mint in this city, amounted to $325,350, or at the rate of more than $1,350,000 per month. As the weather grows warmer in the placer districts, the receipts of gold increase, so that the receipts for the present month, which closes the fiscal year, may reach $1,500,000. Only a part of the gold produced in Colorado is received at the Denver mint.

Prof. Victor C. Alderson, dean of the Armour Institute of Technology, Chicago, has been formally elected president of the Colorado State School of Mines at Golden by the trustees, and will take charge of the school on July 1. It is already arranged that Dr. Hermann Fleck will be chosen for one of the chairs of chemistry. He is a graduate of the University of Pennsylvania, and received his doctor's degree at Tubingen, Germany.

Several mines in lower Clear Creek County around Idaho Springs, after being shut down for several months as a result of a strike by the local Miners' Union, resumed work on June 8 with non-union men, backed by the Citizens' Protective League.

The pyritic smelter at Golden of the Clear Creek Gold Mining and Reduction Company is closed, owing to labor troubles, the men refusing to work on the terms offered by the owners. The management claims that the wages offered are the same as those paid by the Denver smelters, though somewhat lower than those paid formerly. It is also claimed that the low grade of ore treated at the Golden Smelter will not permit the plant to pay the former scale of wages, and that if a sufficient force cannot be got at the new scale the plant will close down indefinitely. The citizens of Golden have organized a citizens' alliance, with the object of preventing or minimizing local labor troubles.

On June 8 the new zinc smelter at Pueblo, of the United States Zinc Company, blew in. The first spelter ever produced in Colorado, except a nominal quantity, produced at a small plant in Denver in the late 80s, was cast. The new smelter will be running at full capacity in about three months, and those Colorado ores having zinc as the leading metal, which a few years ago were considered practically worthless, and a serious drawback to the operation of silver mines, now have a distinct market value. Four years ago E. O. Jacobson & Co., of 2 to 4 Stone Street, New York City, began to purchase zinc ores at Leadville for shipment to Europe. The Guggenheims and Belgian men became interested with E. O. Jacobson & Co.; the United States Zinc Company was formed in 1901, and the erection of the zinc smelter at Pueblo begun. The plant has a present capacity of 60 tons per day, which will be increased as found desirable. The Jacobson firm has shipped about 75,000 tons of Colorado zinciferous ore to Europe at a freight of from $9 to $10 per ton. The Pueblo plant was built and opened under the direction of William Schulte, of Overpelt, Belgium, one of the leading zinc metallurgists in Europe. The chief ore supply will come from Leadville.

San Francisco. June 10.

(From Our Special Correspondent.)

For many months the miners and smeltermen at the Mountain Copper Company's mine have been on strike, but the company obtained men to fill the places of the strikers and kept on work, though hampered to some extent. Manager Lewis T. Wright employed union and non-union men as he pleased. Now the Western Federation of Miners has wired the union officials at Keswick to contract no further claims, and to pay all outstanding debts. This is apparently a formal declaration that the strike is off, though the strike was actually lost weeks ago.

The unions gained some of their points in the strike at the gold mines in Amador County, and it is understood they are about to start a big strike in Calaveras County, beginning first at Angels, where the Utica, Lightner and other big mines are located. The Utica is the largest gold producer in the State, and has been for some years. It is stated that no increase of wages will be asked for, but that the miners will demand shorter hours, particularly on the day shift. If the latter county is thoroughly unionized they will then take up Tuolumne, another Mother Lode county. Reports are that the miners will make their demands before July 4. In Santa Cruz County, where are the largest lime deposits of the State, the Lime Workers' Union has ordered out its members, demanding an increase of $5 per month.

Two big gold dredgers were burned within one week in the mining districts, one belonging to the Ashburton Mining Company, near Folsom, and the other owned by the California & Detroit Mining Company, near Redding. In one case the loss was $80,000, and in the other $100,000. In one instance the use of gasoline aboard was accountable, and in the other the cause is unknown. Each dredger was insured for $30,000. Dredgers have been considered good risks by the insurance companies, but it is probable rates will be higher in the future.

A fire last week at the mining town of Stent, Tuolumne County, destroyed 14 buildings, and another one at Randsburg, Kern County, destroyed about $100,000 of property. No injury was done to mining plants in either instance.

The Mining Committee of the Los Angeles Chamber of Commerce is looking to the drilling of more water wells, and the erection of more water signposts in the desert regions of San Bernardino, San Diego and Inyo counties. Mining men interested in those regions are backing the movement. The sections referred to are poorly suplied with water, the wells or springs are very long distances apart and difficult to find. More painted signs as to distance and direction are needed, and many more wells are necessary to make prospecting safe. If the Los Angeles men go at this thing in earnest it will be a boon for desert prospectors, for every year there are deaths from thirst in the desert country. In fact, the writer believes the proper development of water supply in the desert regions of Southern California would eventually result in much more benefit to Los Angeles than having the American Mining Congress meet in that city next year, a plan now attracting considerable attention there. A committee has been appointed to raise the preliminary necessary $6,000, and men will be sent to Deadwood in September to try and induce the Congress to decide on Los Angeles as representative of Southern California, Arizona, Western New Mexico and Southern Nevada.

Spokane, Wash. June 12.

(From Our Special Correspondent.)

S. H. C. Miner, of Granby, Quebec; John Stanton, George M. Luther, J. B. F. Herreshoff, of New York; W. A. Paine and Clement Houghton, of Boston, were in this city during the week, returning from

a visit to the Granby Consolidated properties at Grand Forks, B. C.

Larson & Greenough, the owners of the Morning at Mullan, Idaho, are making improvements costing $10,000. Ten new jigs will be installed to treat tailings that were formerly washed into the creek; 10 Wilfley tables are being added, and a new vanner house has been erected. A new 50-h.p. Corliss engine will be installed, and the water supply line will be rebuilt.

C. C. Braden, manager of the American Smelting and Refining Company's smelters in Montana, was here this week, and announced that the third stack has just been blown in at the East Helena smelter. He says the labor troubles are all over. He said that the company has been unable to handle British Columbia lead ores, on account of high freight rates, but is taking one-third more ore from the Coeur d'Alenes than ever before, from 17,000 to 18,000 tons a month.

The Washington Water Power Company, which is building a long-distance transmission line to furnish electricity to the mines in the Coeur d'Alenes, will put in a 12,000-h.p. electric plant at Post Falls, Idaho, and will run a second power line from here to the Coeur d'Alenes, via the Post Falls plant. It can then furnish power from either Spokane or Post Falls. Its first line should be completed about July 1.

B. C. Riblet, mining engineer, has sworn out a warrant for the arrest of Howard Kressly, who is believed to have secured $50,000 from his confessed forgeries, of Lucile Dreyfus stock, and other frauds. Mr. Riblet charges him with embezzling 75,000 shares of Dewey Consolidated stock. Kressly cannot be found. His frauds in the Lucile Dreyfus Company indicate that he illegally issued about 900,000 shares.

San Luis Potosi, Mex. June 2.

In Jalisco the Government has granted to Trinidad Garcia a concession to a "zone of exploration," covering a tract 30 kilometers square, to prospect for cobalt and nickel.

In the State of Mexico, at Tlalpujahua, a 3-compartment shaft is started on the Old Abe property, under the superintendence of Robert Wilson. At the Dos Estrellas Mine the output for May amounted to a little over $150,000.

In Durango a Chicago company, represented by F. J. Lichtenberger, has bought for $200,000 gold, the mines of La Union, La Peruna, Gran Senora, Zargoza, and several other less important claims, at Panuco de Coronado. The new company will be known as the Carvuado Durango Mining Company, with a capital of $1,000,000. The properties adjoin those of the Avino and the San Luis Mining Company, the latter a heavy shipper. At Guanacevi the Nueva Porvenir has ordered a new plant for sinking deeper. M. J. Gilpin is in bonanza in his Nueva Antralia. The Soto Miue is sending very high-grade ore to the Guanacevi reduction works. A rich gold strike is reported from Topia. The Penoles Company, of Mapimi, which has been drilling at Cerro del Gallo ,some 20 miles from Mapimi, has struck a 4-ft. vein of good coal, and after the extent of the bed has been proved, the company will sink a shaft. Some good tin deposits are reported near Jaltomates by the Pittsburg Gold Mining Company, and negotiations are said to be on for purchase by a large English syndicate, represented by J. H. Laughlin. At Velardena the Guggenheim Exploration Company, which has the Copper Queen, Santa Maria and San Lorenzo, has finished a railroad from the Copper Queen to Velardena, a distance of 16 miles. Concessions have been granted by the State for a line from Jimenez to Durango, the survey of the Mexican International Railroad has been completed from Tepehuaues to Guanacevi, a distance of 60 miles; the San Acacia Mining Company has begun a railroad from its mines at San Juan de Guadalupe to connect with the Mexican Central Railroad, near San Isidro in Coahuila; G. B. Demis has in contemplation an electric road from Durango to San Dimas, a distance of 160 miles; and the Descubridora Mining Company is preparing to build from its mines to Inde, a distance of 60 miles. It is said that the Guggenheims are still negotiating for the Descubridora, and have an option on the Caballo Mine of W. S. Benton, also near Inde.

The Coahuila & Pacific has now five kilometers graded from Avalos, and concessions have been obtained from Concepcion del Oro. The camp is producing heavily in gold, silver, lead and copper. In Coahuila concessions have been granted for a railroad from Allende station of the Mexican International Railroad to Zaragoza; and Messrs. Duncan, McKay and Edward Laroche have contracted with the State to build at Saltillo a smelting plant to cost not less than $500,000.

Victoria, B. C. June 10.

(From Our Special Correspondent.)

The Provincial Mining Association, organized in February, now has local branches in all the important mining centers. At the present session of Parliament, it was instrumental in passing laws amending the assessment act, so that claims on which taxes are not paid after due notice are sold or revert to the crown. October 1 claims will be advertised for sale at public auction, and if not sold, exempting from taxation a group of claims up to 8 by performing labor to the amount of $200; re-enacting of the Coal Mines Regulation Amendment Act, prohibiting the filling of positions of trust or responsibility by Chinamen or persons unable to speak English; passing the Conciliation Act, an attempt to minimize strikes.

Excellent reports are received of developments at the Velvet, a British-owned mine at Rossland, ore running from $20 to $30 per ton, having been followed 90 ft. in the second level. Good ore has also been found in the third level drift. Recent smelter returns gave a net valuation of $18 per ton, freight and treatment charges deducted. At the White Bear in Rossland, arrangements are being made to sink to 950 ft. The new head works at the Spitzee are nearing completion. The contract for the new concentrator building at the Le Roi No. 2 has been let, and the Nickel Plate is being unwatered. In the Boundary District only five furnaces are in operation in consequence of a shortage of coke, but in spite of this, two mines, the Snowshoe and B. C., established shipping records last week. The Granby Company has recently installed a steam shovel for handling Knob Hill ore. Mr. John Stanton, with other directors, visited the property recently.

The copper mining situation on the Coast is satisfactory. At Mount Sicker the Tyee Copper Company is making an excellent showing. During May 4,260 tons of ore were smelted, the receipts being $60,500. The output from the Tyee has been steadily maintained since the smelter was installed at Ladysmith. For March, with only 25 days' smelting, there was a yield of $52,336; in April 4,550 tons of ore were smelted, and 418 tons of matte produced, valued at $60,313.

Shipments are being made from the Homestake group, on Princess Royal Island, on which some high-grade ore bodies are being developed.

In the Nelson District progress is being made in the development of the Venus-Athabasca. The Athabasca is a free milling quartz property, formerly owned by a London company, which came to grief. An amalgamation with the Venus Company was effected at the instance of Canadian shareholders this spring. The country rock is much broken, rendering development costly.

At the Ymir Mill, 70 stamps are in commission. The April returns show 4.750 ore crushed, yielding 1.080 oz. bullion, valued at $12,250. There were also shipped 240 tons of concentrates, valued at $600, and 3,050 tons of tailings were treated with cyanide, estimated value, $1,750.

The London & British Columbia Gold-fields, which was until recently under the management of the late Roderick Robertson, was one of the most successful of the English mining companies operating in British Columbia. The present condition of the company is due to the recent depression in silver-lead mining in the Slocan; to the reconstruction of the Ymir, in which the London & British Columbia Gold-fields owns shares, on which assessments were levied, and also to some bad management in connection with the Enterprise Mine, one of the company's properties.

It is announced that the general manager of the Crow's Nest Pass Coal Co. has received instructions from the directors to prepare for the immediate construction of 500 additional coke ovens at Morrisey. The Chinamen brought in to take the place of white labor employed at the coke ovens were dismissed after trial. It appears that white laborers were receiving 75c. per oven, and struck for 95c. One man could pull two ovens per day. This the Chinamen, who were paid $1.50 a day, were unable to do.

London. June 6.

(From Our Special Correspondent.)

The long-discussed amalgamation between the Mount Lyell Mining and Railway Company and the North Mount Lyell Copper Company is now well within sight. An agreement has been come to between the two boards of directors, and only the consent of the shareholders is now required. There can be no doubt that the agreement will be ratified, as in this case the shareholders are not as refractory a proposition as the directors. The Mount Lyell Mining and Railway Company is an Australian organization, and its shares are largely held in this country, while the North Mount Lyell is an English Company, and a majority of its shares are owned here. The former company has paid handsome dividends, while the latter has never arrived at the dividend-paying stage. The Mount Lyell, however, has partly exhausted its best ore, whereas the North Mount Lyell has important reserves of good class ore. These circumstances explain how it is that so much difficulty has been met with in negotiating for an amalgamation. There are so many advantages in the amalgamation that the directors of the two boards did well to persevere. To put it briefly, the Mount Lyell has large sums of cash on hand and a good smelting and refining plant, while the North has the larger reserves of ore. The terms agreed on by the directors are to form a new company, registered in Australia, with a capital of £1,300,000, of which £600,000 shall be the purchase price for each company, while £100,000 is to be held in reserve for future issue. The North Mount Lyell Company also has £140,000 outstanding debentures, which are to be exchanged into similar debentures to be issued by the new company. It might be objected that, as the majority of the shares in the amalgamated company are held in this country, it would be better to form an English company instead. The direction and control of the two companies has, however, been rather Australian than English, so that the present proposition will be the best. Mr. R. Stricht has already taken over the management of the properties of the two companies.

During recent years several important amalgamations in the steel trade have been effected in England. It is now announced that Dorman, Long & Co., of Middlesbrough are to absorb their neighbor, the Northeastern Steel Company, the scheme being for Dorman, Long & Co. to buy the shares of the other company by the issue of new stock of their own. It is less than a year ago since Dormans amalgamated with Bell Brothers, by means of a somewhat similar exchange of shares. In that case the amalgamation was between a firm of smelters and steel producers on the one hand, and a firm of constructional steel producers on the other; and the advantage was that the whole manufacture of the complete article was placed under one control. In the present case the reason for amalgamation is different. The Northeastern Steel Company is owner of blast furnaces, and its specialty is the production of steel rails by the basic bessemer process. It is rather "unity of interest" that has dictated the present step. The plant of the Northeastern Steel Company is thoroughly up to date, and large sums have been spent on it during the last few years. The capacity of the blast furnaces is about 250,000 tons a year, and is practically equal to that of Dormans. The combined firm will produce basic steel entirely, for Dormans plant is all basic open-hearth. In point of output the combination will be second only to Bolckow, Vaughan & Co., and it will be in front of the other recent combination, Guest, Keen & Nettlefields.

Sydney, N. S. W. May 18.

(From Our Special Correspondent.)

Victoria.—In addition to the Jumbunna and Outtrim coal miners, those at Coal Creek are now out, owing to reductions in the hewing rate, from 4s. (96c.) to 3s. 6d. (84c.) per ton, in accordance with an agreement between the coal owners and the miners, based on a sliding scale, the price paid for the coal by the Victorian Government. The Government price fell in December last, and the management recently notified the men it would adhere to the sliding scale.

The management put the sliding scale into force, the miners struck work, and now the three principal coal mines in Victoria are idle, except for a few non-unionists.

The coal strikes have been put in the shade by the strike on the railways of Victoria, which has completely paralyzed trade for the time. The railway employees are civil servants, but the majority have joined one or other of the several unions. The Victorian Government deemed it inadvisable that these unions should be affiliated with the Trades Hall, an outside labor organization, which would have power to call the men out in support of any trouble, whether connected with the railways or not, therefore the executive of the unions in connection with the railways were instructed to withdraw from their affiliation with the Trades Hall. This the union officials refused to do, so were given a week's notice to leave the service. The first to go out on strike were 650 drivers, 500 firemen and 250 cleaners. The issue was whether the State Government or the strike committee was to have the controlling voice in the management of the railways in which £40,000,000 of taxpayers' borrowed money has been sunk.

The Premier, Mr. Irving, tried to prevent the strike by meeting the men, but when the strike came he was firm. Then the strikers alienated sympathy by indifference to the convenience of the public. Like the Western Australian railway strike of July, 1891, this one only lasted a week. The strike committee found that public opinion was too strongly against them, and that the Government was too well supported in Parliament, which had been assembled. The strike committee surrendered unconditionally, much to the surprise of the men, and steps are being taken to resume traffic as soon as possible. There is a great outcry in labor circles at the defeat, and the labor party will try to obtain greater representation in Parliament.

Perth, W. A. May 11.

(From Our Special Correspondent.)

Kalgoorlie.—The management of the Associated Northern Mine announces that all the heavier parts of the new ore reduction plant, comprising Gates' crushers, Krupp roll mills and Merton's furnaces, have been ordered from the manufacturers, and that provided no unforeseen delay in delivery occurs the plant will be in full operation by December 31. The first

of the three ore-bodies intersected by a bore, at a vertical depth of 950 ft., should be cut in the Iron Duke shaft at that point. About 1,100 tons of high-grade ore, comprising the May output, are now at or in transit to the smelters. The Diamond drill on the eastern boundary of the company's Iron Monarch lease, has cut the western side of the property at a depth of 1,040 ft. A hole is now being drilled 200 ft. east to prove the payable body of oxidized ore that was cut by the first drill hole. Following valuable discoveries recently in the Ivanhoe Mine announcement is made of another good find at a depth of 1,600 ft. Previous to this the Great Boulder was the only mine on the "Golden Mile" to prove high-grade ore at 1,600 ft. The new find will give an impetus to deep developments in other mines.

The east lode at the 865 ft. pierced by the drill carried 12 dwts. per ton, and was 17 ft. wide, whereas it is found to be fully 18 ft. wide, with values of 24 dwts. per ton. On the Boundary lode, known as the Horseshoe-Boulder lode, the drill showed 6 ft. of ore and a value of 15 dwts. per ton, while the cross-cut shows values of 2 oz., 17 dwts. per ton for a width of 6 ft. The mine is preparing to sink the main shaft to 3,000 ft.

The Great Boulder Company has ordered the necessary plans for sinking to 3,000 ft. The main shaft will soon reach 1,800 ft.

The Lake View Consols Mine has made rapid progress towards prosperity. During the past year the mine's ore reserves have been enormously increased, and recent finds have justified the optimistic views taken in April of last year. The developments, however, show that large bodies of pay ore were driven alongside of in the upper levels, without being discovered, for instance, in the No. 3 level.

The Great Boulder Perseverance official estimates of ore reserves show that down to the 9th level the deepest point yet opened, each level contains, on an average, about 100,000 tons of ore, estimated to carry between 30 and 40 tons avoirdupois of gold. The main shaft is down nearly 1,100 ft.

The Westralia Mount Morgans Mine has proved the lode to be about 100 ft. wide at the 300-ft. level, and worth 15 dwts. per ton. The mine has a splendidly equipped plant.

Laverton.—The Craigiemore Mine is looking very well. Cross-cutting at the 300-ft. level is proceeding. Good gold is being obtained from the stopes at the 200-ft. level. April returns are the best for four years past.

The Golden Rhine, where work was for some time impeded by a hard bar, is in full operation on good stone.

Kookynie.—The Cosmopolitan Mine has published April returns, viz.: Crushed 6,126 tons for 3,780 oz.; tailings, 5,335 tons for 922 oz.; concentrates, 90 tons for 523 oz.; total, 7,126 tons for 5,225 oz.; valued at £18,709. This is a record yield, as against a pre- 392 oz. 19 dwt.

Murchison Fields.—The Great Fingall is still the center of attraction. The April returns are: Milled, 8,180 tons for 10,391 oz.; cyanided, 5,280 tons for 1,832 oz.; concentrates, 76 tons for 865 oz.; total, 8,180 tons for 13,088 oz.; valued at £46,098 ($230,-450).

Lemonville continues to return good yields. The Wheel of Fortune South has crushed 120 tons for 392 oz. 19 dwts. 8 grs.

The Victory United Mine, at Cue, is at a standstill pending re-construction to provide more capital.

GENERAL MINING NEWS.

Mineral Oil Exports.—In May the United States exported: Crude oil, 13,824,696 gals.; naphthas, 343,-194; illuminating, 53,080,343; lubricating and paraffin, 8,232,493; residuum, 72,030; total, 75,552,756 gals., as against 88,636,687 gals. in the same month last year. In the five months ending May 30 the exports amounted to 342,019,140 gals., which compares with 422,955,300 gals. in the corresponding period last year; showing a decrease of 80,936,160 gals., or 19.1 per cent, principally in illuminating oil and residuum.

ARIZONA.

GRAHAM COUNTY.

The employees of the Detroit Copper Company, at Morenci, and of the Arizona Copper Company, at Clifton, struck recently, demanding the 8-hour day called for by the law passed by the Arizona Legislature, and also an increase in wages. The Detroit Company offered an 8-hour day with no increase in pay. Agitators from outside got the Mexicans and Italians excited, and the employees seized the works. Governor Murphy called out the Territorial militia and asked help from the Federal authorities. Five companies of cavalry were ordered to the district, and the strike leaders were arrested on June 12, charged with inciting riot. The strikers realizing that there was trouble ahead, accepted the original offer of the company, though the Italians were not included in the settlement. All is now quiet.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Black Mountain Mining Company.—This company, which owns a number of gold claims on Silver Creek, is getting ready to start developments. A. I. Richardson, of Kingman, is general manager.

Climax.—This mine, at Cerbat, is temporarily closed, pending timbering up some of the workings.

Comstock.—This mine, at El Dorado Canyon, is getting its mill ready to start on Sheeptrail ore.

Cyclopics.—This mine, at Gold Basin, has its rock crusher in place, and is installing better cyaniding equipment.

Elkhart.—The 100-ton mill at this mine, at Chloride, is running full time. Shipments of concentrates and rare ores have been greatly increased.

Enterprise.—This mine, in the Wallapai Mountains, 15 miles east of Kingman, is reported in a large body of lead-silver ore, and a reduction plant is to be installed.

Gold Road.—The new 300-ton mill and cyaniding plant belonging to the mine in San Francisco District has been repaired, and is running smoothly.

Keystone.—This silver property at Mineral Park has been taken over by a San Francisco company, which will work it.

Leland.—The new mill, near Acme, will be in operation within a few days.

Midnight.—This mine, at Niggerhead, has only two men at work, drifing on the 200-ft. level.

O. K.—The mine and mill at Gold Roads are running full time.

Oro Plata.—The breakdown of the pump at this mine in Oro Plata District recently caused several days' delay.

Pinkham.—The Schee Brothers, who own this mine, near Chloride, will soon return from California to resume work.

Queen Bee.—This mine, at Mineral Park, posted a notice June 1 that under the 8-hour law men would be paid 35c. an hour, and a strike ensued. The mine was shipping low-grade ores regularly. Jacob Detar is superintendent.

Tennessee.—A contract for 100 ft. of drifting on the 500-ft. level is completed on this mine at Chloride, by Louis Stenzel. Another 100 ft. is being run.

CALIFORNIA.

BUTTE COUNTY.

Big Butte Mining Company.—This company has been for the past two years developing a hydraulic mine on the west branch of Butte Creek, about 2 miles from Berdans. A dam has been built to impound the tailings and the giant has been running for about 60 days. The returns are said to exceed expectations. A ditch nearly 7 miles long was built to bring in the water.

CALAVERAS COUNTY.

Big Six.—Preparations are being made to work this mine, near Jenny Lind, on a large scale.

Esperanza.—At this mine, sometimes known as the Boston, near Mokelumne Hill, work has begun under J. J. McSorley. The mine is being unwatered, and the machinery put in order.

Gwin Mine Development Company.—This company, at Gwinmine, F. F. Thomas superintnedent, has a traction engine running between the mine and Valley Spring, the railroad station. Supplies and material are cheaply handled.

Highland Mary.—This gravel mine, on Tunnel Ridge, near Mokelumne Hill, owned by Ratto Brothers and Daniel Black, has been bonded to a Nevada company and work has started.

Rialto.—This property is near Gwinmine. Operations are to begin at once.

Stockton Hill and Hexter.—These mines, near Mokelumne Hill, have started up under Superintendent Robinson. On the Stockton Hill the old Union shaft is used, and on the Hexter the old Magee & Megaw tunnel will be used. Eastern companies have the properties under bond.

Wilbur-Womble Mining Company.—The mill on this porperty at Hodson is nearly completed. It has 35 stamps.

KERN COUNTY.

Baltic.—At this mine, near Randsburg, C. H. Wynn superintendent, the main shaft is down 225 ft., and a large ledge is being worked. The 10-stamp mill has been running steadily since last November.

Johannesberg Mining Company.—The 10-stamp mill being erected on the St. Elmo claim is expected to be in operation by July 1.

Stanford.—The cyanide plant for this property at Randsburg is completed.

Sunshine.—Eight tons of ore from this mine at Randsburg, Atkinson Brothers owners, ran $175 per ton at the custom mill.

Yellow Aster Mining Company.—In this property, at Randsburg, Charles Wier superintendent, the vein in the recent deep strike is said to be 35 ft. wide, carrying about 4 ft. of very high-grade ore. On this ore 140 stamps are dropping, and it takes 12,000 tons monthly to keep the stamps busy. There is no longer any deficiency of water for milling.

MADERA COUNTY.

Yosemite.—In this copper mine, near the north line of the county, plenty of ore is reported in sight. New machinery is on the way.

MARIPOSA COUNTY.

Austin Group Mining Company.—This company, at Whitlock, which has under bond the Regan, Coronado, Whitlock Chief and Golden Gate claims, has also with them a 10-stamp mill. All the claims are shortly to be developed.

Hayseed.—This mine, at Whitlock, which was temporarily closed, has started up again.

Hornitos District.—At Hornitos preparations are being made to work the Eureka and Washington No. 8 and No. 9. Others on the M. L. Rogers estate will shortly be worked.

McAlpine.—In this mine, near Coulterville, S. E. Rigg superintendent, the new shaft is now down 200 ft.

NEVADA COUNTY.

Badger Hill District.—On the Lucky Joe Mine, in this district, two tunnels are being run, and an 18-in. ledge showing free gold has been found. In the same district the Uncle Sam, owned by the Bigelow Brothers, has a good ledge. The main tunnel is in 500 ft.

Delhi.—Work has started on a shaft at the end of the south drift of this mine at San Juan. The property is looking well.

Jim.—This mine, near Graniteville, with three gravel claims and 100 acres of land, has been bonded by I. N. Robinson to H. L. Robinson & Co. The 150-ft. tunnel is to be extended to 1,400 ft. The mine has been worked for years in a small way, and will be now opened on a large scale.

North Star Mining Company.—This company, at Grass Valley, A. D. Foote, general manager, has already 60 stamps at its mines, but is now to have 40 stamps more at the Central shaft. The company has bonded the Peabody from C. Christopher.

Seven-Thirty.—This mine, at Dead Man's Flat, has been bonded to Frank Enzensperger, and is being reopened under his direction.

South Idaho.—In this mine, at Grass Valley, John E. Carter superintendent, some fine specimen quartz is being found. The vein is well defined.

SAN BENITO COUNTY.

Stayton.—Sidney Smith, superintendent of this quicksilver mine reports finding a 9-ft. vein at a depth of 105 ft. in one of the shafts. The ore is of good quality.

SAN BERNARDINO COUNTY.

A. P. Morrison, of Montclair, N. J., sued certain mining men of San Bernardino County, from whom he bought certain desert mines for $25,000, afterward spending $84,000 in development. He claimed there had been a conspiracy to sell him worthless ground. The former owners agreed to deed him certain interests in each of the mines, and the suits were thereupon dismissed.

Vulcan.—This copper group, owned by L. Schwartz and G. Hafstedt, is 38 miles from Manvel. The mines are to be bonded by Los Angeles men.

SAN DIEGO COUNTY.

American Lithia and Chemical Company.—This company, of New York, is being organized to work the lithia deposit on the Mission and Stuart mines, near Pala. There are 10 claims in the group.

Elevada.—This mine, at Banner, owned by the Smoky City Hill and Mining Company, is showing up some good ore at 360 ft. depth.

Hubbard.—At this mine, near Banner, owned by George W. Hazzard, several men are prospecting for another rich pocket, and taking out good ore.

SANTA CLARA COUNTY.

Santa Teresa.—At this quicksilver mine, R. B. Harper manager, a 50-ton furnace is being erected. The ore is expected to yield about $17.50 per ton in quicksilver.

SHASTA COUNTY.

California & Detroit Dredging Company.—The big $80,000 dredger on Clear Creek, near Redding, was burned last week after running two months, the plant being totally destroyed. The insurance was about $30,000. It is stated that the company will build a new dredger at once. Dr. T. R. Heintz is manager, and J. H. Hayes, of Detroit, Mich., is president.

Mabel Emma.—In this mine, at Muletown, a small force is running a drift on the main ledge. A large force is to be put on.

Old Spanish.—It is understood that this mine, near Shasta, will be reopened at once.

SIERRA COUNTY.

Bellevue Mining Company.—At this big drift mine, near Gibsonville, C. B. Wingate manager, and Aug. Holtz superintendent, the men in the tunnel tapped one of the bore-holes from the surface, and the inrush of water damaged about 400 ft. of the tunnel. The tunnel recently tapped the long-sought gravel channel.

Kenton.—At this mine on Kanaka Creek, near Alleghany, operations are to start at once under Andrew Fitzgerald, superintendent.

West Point & Exchange Consolidated.—A strike of pay gravel has been made in this property at Monte Cristo, owned by Beckwith & Son and H. Spaulding, Jr., at the end of the new 1,000-ft. tunnel. The rich blue gravel is about 5 ft. thick.

SISKIYOU COUNTY.

Consolidated Mining and Dredging Company.—E. W. Scott, superintendent of this company at Callahans, denies the report that the plant and property has been bonded.

TRINITY COUNTY.

Dorleska.—This mine, owned by the Union Consolidated Gold Mines Company, of Los Angeles, is at Dorleska. J. Z. Osborne is manager, and M. H. McIlwaine superintendent. The mine is producing handsomely, and is equipped with a 5-stamp battery, a Huntington mill and two concentrators. About 50 men are employed.

Layman.—These quartz claims at Hayfork, owned by J. B. Layman and his four sons, has been bonded to A. J. Van Matre for $50,000. A pay shoot, recently encountered, is quite rich. A new 100-ft. shaft is to be sunk.

TULARE COUNTY.

Fountain Springs.—At this place M. Groves is opening a mine on the land of Mrs. R. B. Miller.

Mining Ellen.—This mine, near Porterville, may be sold to W. G. Barney, of Prescott, Ariz., who has recently been examining it.

TUOLUMNE COUNTY.

Blue Eagle.—D. A. Lumsden and Joseph Screech have bonded to George F. Beveridge, of San Francisco, this quartz mine in Jawbone District, together with the water rights.

Eagle-Shawmut.—A new furnace for the chlorination plant at this mine at Chinese Camp, is giving good satisfaction. The mine is owned by John Rosenfeld's Sons, of San Francisco, and employs 260 men.

Rawhide.—The cyanide plant at this mine, at Jamestown, owned by W. A. Nevills, is being enlarged to 100 tons daily capacity.

Star.—This mine, at Jupiter, is running its 10-stamp mill day and night on good paying ore.

Two Brothers.—At this mine, Groveland, three shifts are employed in the shaft, the rock being very hard.

VENTURA COUNTY.

Mt. Alamo Mining Company.—This company, operating a mica mine, has been shipping to Bakersfield, but will now put on a traction engine and haul 40-ton loads to Lancaster, a distance of 71 miles. From there it will ship by rail.

COLORADO.

BOULDER COUNTY.

Belle.—A rich strike is reported from this mine, near Salina, at about 280 ft. from the mouth of the lower tunnel. The property is an old producer, with about 2,400 ft. of drifting and tunneling done. H. T. Webber has charge for the Belle Gold Mining Company.

Montgomery Gold Mining Company.—A trial run is being made at this company's stamp mill, near Ward. The company is capitalized at $750,000, held chiefly by Colorado Springs people. R. G. Mullen is president.

CHAFFEE COUNTY.

Copper King.—Regular shipments of copper ore are made from this mine at Turret, to the Salida Smelter.

Gold Bug.—This mine, in the Turret District, is being unwatered, under lease and bond by the Par Value Mining Company.

Madonna.—This mine, in the Monarch District, is making weekly shipments of three cars of galena ore to the Salida Smelter.

Vivandiere.—This property at Turret, worked by the Twin City Mining Company, of Salida, has a fine ore-body in the 500-ft. level.

CLEAR CREEK COUNTY.

Colorado-Oregon Mining Company.—It is reported that this company has purchased the standard property up Fall River for $150,000. The Standard group consists of 15 patented claims, two mill sites and a 100-125-ton amalgamation and concentration mill. The property is developed by a 900-ft. tunnel. The company has 13 claims adjoining the Standard. D. B. Davidson, of Galesburg, Ill., is the chief stockholder and manager; with him are associated Des Moines and Burlington, Ia., men.

Hazelton Consolidated Mining and Tunnel Company.—This company is building a shaft house on its Baltimore group, near Silver Plume, and has ordered a 100-h.p. boiler and a 15-drill compressor.

FREMONT COUNTY.

Columbia Crude Oil Company.—A contract has been let for drilling another well in the Florence oil belt, and work has begun.

Portland Cement Company.—The gypsum quarry, at Coaldale, employs quite a large force. The plaster of paris mill is nearing completion.

Rocky Mountain Fuel Company.—This Denver company, which recently purchased the Smith & Cowan coal mine, near Florence, is improving the property.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Mining operations in the outside mining districts are seriously interfered with by late heavy snows and rains, causing a surplus of surface water.

Cashier Gold Mining and Reduction Company.—A shipment made during the past week to the sampling works brought values of 21.76 oz. gold, 21.64 oz. silver, and 17.95 per cent copper, or a net value of $459 per ton at the smelters. The best ores came from the Golden Wedge, while the other ores came from the Pittsburg workings. The Pittsburg shaft is down 617 ft. The company has declared a dividend of 1-3c. per share, payable June 15. B. L. Campbell, Central City, is superintendent.

Continental Electric Power and Irrigation Company.—This company, capital stock, $1,000,000; incorporators, W. A. Haggott, W. P. Clough, C. S. Birkins and Fred G. Shaffer, has been incorporated to build a reservoir near the headquarters of Clear Creek, near Empire, to furnish water power, electricity for the mines and mills of Clear Creek and Gilpin counties, and to irrigate lands in Jefferson, Adams, Weld and other counties. The general offices will be at Idaho Springs.

Hall—This property, operated by the owner, Isaac Hall, of Russell Gulch, the past two years, has been sold to S. D. Hanna, of Houston, Texas, the reported consideration being over $40,000. The purchaser intends to erect larger shaft buildings, install machinery and develop the property on a larger scale. The property has at less than 150 ft. produced ores running from 2 to 6 oz. gold per cord, with tailings as high as $20 per ton; and first-class smelting ores about $175 per ton; second-class ores from $50 to $100 per ton, the ores carrying copper.

Kansas-Burroughs Consolidated Mines Company.—The May shipments from the mines on Quartz Hill to the stamp mills, concentrator and sampling works, were 165 cars, or 1,405 tons, the greatest proportion to the stamp mills. R. Sykes, Central City, is the manager of the company.

Waltham.—This property has been purchased by Englishmen, who will operate as the Waltham Mine, Limited. The price was $110,000, paid by Dr. John H. Gower, of Denver, representing the purchasers. The property is in Willis Gulch in the Russell District, has been operated under a lease and bond by Idaho Springs and local parties for nearly a year, and the estimated production, under 150 ft. depth, was over $60,000. The lessees sunk the shaft to nearly 200 ft., installed machinery and erected top buildings. The property has made an excellent record during the past nine months.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Leadville Zinc Production.—The daily tonnage holds up well, and shipments average 225 tons a day, including crude zinc and concentrates. Some 3,500 tons of this tonnage, of which the greater part comes from the Adams and the A. Y. & Minnie, go to Belgium.

California Gulch Placers.—A number of men are at work washing over old territory. One nugget found this week weighed 5 oz., and created considerable excitement. Work on the Uintah placer has not started.

Dewey District.—In the extreme southwestern part of the camp much new work is being done. On the Pacific Company's property the Gopher shaft, down 170 ft., is to go another 30 ft., where a fine body of sulphides was cut. The Elkins Mining Company is arranging to sink its shaft another 100 ft., while the California Mining Company is pumping out water preparatory to resumption. The Keystone is preparing to sink 300 ft. deeper. The Homeless, the Pioneer, the B. M. and others are showing ore, and there is much activity.

Fiarview.—New work is opening up good grade iron in virgin ground. The old workings are shipping 40 tons daily of good iron.

Fortune.—This property, at the foot of Little Ellen Hill, owned and operated by James McNeece, was damaged to the extent of $8,000 by an explosion, and Superintendent Barker was killed. The explosion of 200 lbs. of giant wrecked the machinery and everything else on the property. The fire burned but a short distance down the shaft.

Keystone Mining Company.—This company is successfully handling the water in the Rex workings, and is arranging to sink the old shaft to the lower contacts. Pittsburg, Pa., people are back of the enterprise.

Lost Canon Deep Tunnel Gold Mining Company.—This concern, financed by Buffalo, N. Y., people, and operating near Twin Lakes, has cut in the 700-ft. tunnel a vein 8 ft. wide, and for 100 ft. in one direction, and 60 ft. in another. The vein shows good values in gold, lead and silver.

Matchless.—Lessees are working under lease from Mrs. H. A. W. Tabor, who has three years to redeem the property sold some time ago at sheriff's sale. No effort is being made to get at the lower levels on account of the water.

New Leadville Home Mining Company.—Shipments are 130 tons a day of rich ore. The Alice shaft tonnage of low-grade iron is cut off for the present, owing to its low-grade. A drill hole is being sunk to the lower contacts.

Small Hopes Mining Company.—No work is being done at the R. A. M. at present, but both the Emmet and Boreel shafts are busy, and a fair grade lead ore tonnage is made.

Sugar Loaf Placer.—After years of idleness some washing is being done on this ground, near the Dinero, and four men in five days have cleaned up $400.

Valley Leasing Company.—At the annual meeting the election resulted as follows: President, W. H. Winton, Brattleboro, Vt.; secretary-treasurer, Frederick Carpenter, Springfield, Mass.; directors, Victor Brett, Bangor, Me.; E. C. Robertson, Hinsdale, N. H.; O. U. Cassidy, Youngstown, O.; J. W. Dean, Denver. Mr. J. H. Henley is retained as manager, and an extensive development on this Breece Hill property was approved.

PARK COUNTY.

Kansas & Colorado Placer Company.—A force of 20 men is busy preparatory to working the Lowe placers above Fairplay. Cyrus Davis is superintendent and S. T. Howe, of Topeka, Kan., secretary.

Park Range Mining Company.—This company is working under lease and bond a group of five claims on London Mountain. Air drills and pumps are to be installed, and the property developed by a tunnel. The owners are D. McNebin and W. Murray, of Leadville, and J. G. Morgan, of Denver. Charles Johnston is manager.

SAN JUAN COUNTY.

(*From Our Special Correspondent.*)

East New York & London Mining Company.—Representatives are liquidating several years' back taxes on the properties near Mineral Point, which have lain idle since 1883. The projected extension of the Mears railroad to Lake City has given an impetus to operations.

Hercules Mining Company.—This Silverton company has been re-organized, and will shortly resume work. The Little Dora Mill will start at full capacity.

Highland Mary.—Work is pushed on the upraise to connect the Highland Mary with the Blowout Tunnel, about 400 ft of work requiring two months to complete. The upraise is being run on a 2.5-ft. vein of shipping ore.

Minnie Gulch Mining and Tunnel Company.—Power will shortly be substituted for hand drills at this Silverton property.

Royal Mining Company.—The cross-cut to cut the Mazeppa vein has broken into a blind lead of rich lead ore. The drifts on the King vein are in good ore.

Silver Lake Mines Company.—The daily output at this Silverton mine averages 260 tons, which is concentrated at the mill about 5 to 1, the concentrates averaging $80 per ton.

Silver Ledge.—Manager J. B. Warner has succeeded in clearing matters so that work will be started shortly at both mine and mill.

Stony Pass Mining Company.—Besides driving the Mammoth Tunnel, this Silverton company will shortly begin work on a mill in Cunningham Gulch, a sawmill on Cement Creek, and will install a large plant of machinery at the Hercules Mine in Prospect Basin.

SUMMIT COUNTY.

Iron Mask.—This Kokomo property has been leased to Wiley and Cantwell, and is to start again.

Uthoff.—Additional machinery is being installed at this mine, near Kokomo. It is said that the company has contracted to supply 1,000 tons of iron sulphide ore to smelters. Alex. Borg is manager.

Wilfley and Kimberly.—These Kokomo properties are worked steadily. E. E. Byron is manager.

TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

The rainy weather of the past 10 days has made ore hauling disagreeable, though most of the large mines have close railroad connections. Surface water is bothering some of the leasers. The weather has also caused bad air in some of the mines.

Block Seven School Section.—The lessees on the south half of this block have had to close down for a few days on account of surface water. Considerable ore has been shipped from the School Section, which is situated in Grassey Gulch, now known as Cameron.

Cyanide Mills.—A fair sized plant has been erected in the old Van Fleet sampler, near Gold-field primarily for the treatment of Ironclad ore. The plant is equipped with a crusher and leaching vats. No attempt is made to roast the ore, as only the oxidized ore is handled. The plant is run by the Globe Reduction Company, of which Messrs. Temple and Ross, of Cripple Creek, are the leading men. O. B. Finn has a small experimental plant on the Magna Charter, consisting of leaching vats only. The ore in this vicinity is low grade, oxidized and friable. A plant is also spoken of for Copper Mountain to treat the ores in the neighborhood of the Fluorine Mine. A small plant is to be erected on the Ingham dump. One was also erected on the Pharmacist some time ago, but was never used. It is reported that a small experimental plant is to be put in on Straub Mountain. The Lincoln, near Gillett, it is reported, will build a small mill. The treatment of the low-grade oxidized ore about the district is watched with interest.

Golden Cycle.—The suit brought by the minority stockholders against the majority is still in progress in Colorado Springs. The evidence of the plaintiffs has been submitted. Affairs at the mine continue very satisfactory.

Hawkeye.—Sinking is in progress on this property near Gillett, worked under lease. The shaft is equipped with a steam hoist. A good showing is reported.

Henry Adney.—Air drills have been installed, and sinking has begun again. The claim is just west of the Old Gold and C. K. & N. properties, and is worked under lease and bond. This section of Beacon Hill is one of the liveliest places in the district.

Katinka.—A new plant of machinery, including a compressor, is being installed on the shaft at this property, which adjoins the Mary McKinney on the south. The property is worked under lease by Chas. Waldron, manager of the Last Dollar. Considerable ore has been shipped from the property which has the continuation of the Mary McKinney vein.

IDAHO.

BLAINE COUNTY.

Rosette Development Company.—It is reported that a 10-stamp mill will soon be erected on this company's property on Little Smoky River, in the Rosette District. C. C. Ruttwauff is manager.

IDAHO COUNTY.

Crackerjack.—The additional five stamps for this 5-stamp mill, at Buffalo Hump, are on the road from Chicago. The mill, with power equipment, was built for 10 stamps. About 25 men are employed.

SHOSHONE COUNTY.

Ajax.—A steam hoist, it is said, is to be installed on this property at Buffalo Hump. The mine will be operated by the Concord Mining Company. R. E. Davidson is manager.

Gold Hunter Mining and Smelting Company.—A trust deed has been filed by this company to Thomas F. Keeley, of Chicago, for $51,300, covered by six promissory notes. The deed is signed by P. J. Hennessy, president, and J. B. McCormack, secretary. Mr. Kelley is one of the heaviest stockholders, and the deed was given to cover indebtedness due him. The mine is at Mullan and is a regular producer.

Morning.—A number of improvements is under way at this mine at Mullan, necessitating an expenditure of about $10,000 for machinery. A vanner house has been erected, and machinery will be installed to replace the slime tanks, a 50-h.p. Corliss engine, 10 new jigs, and 10 Wilfley tables are being installed. The mill is run by water power, the engine being to run the plant when water is low. The two miles of flumes are being reconstructed. W. H. Meyers is manager.

ILLINOIS.

CHRISTIAN COUNTY.

(From Our Special Correspondent.)

Christian County Coal Company.—This company, at Taylorville, is shut down, because the miners refuse to undercut the coal before blasting, and the coal is mostly shattered into slack and is unmarketable. This is a result of the mine-run system of payment, a company with a fine vein of coal is put out of business by a pernicious system of mining upheld by the miners' union.

Springfield Coal Mining Company.—This company is putting in a second 10-ton electric locomotive at its mine in Taylorville. The locomotive is furnished by the Goodman Manufacturing Company, of Chicago. The company is producing about 1,000 tons of coal daily, and with the extra locomotive expects to produce between 1,200 and 1,300 tons, with fewer mules than at present.

MACOUPIN COUNTY.

Virden Coal Company.—The mine was closed down recently, and the men paid off. It is reported that the mine may be acquired by a Pittsburg Company.

INDIANA.

PARK COUNTY.

(From Our Special Correspondent.)

Mecca Coal and Mining Company.—This company and the New Century Coal and Mining Company have consolidated and re-incorporated under the name of the Mecca Coal and Mining Company; capital stock, $100,000. Directors, A. L. Allias, F. J. Urbain, W. B. Rings and G. H. Webster. The company will open new mines and improve the mines now being operated in this and adjoining counties.

PIKE COUNTY.

(From Our Special Correspondent.)

Minnie Coal Mining Company.—This company has purchased 1,500 acres of coal lands, near Petersburg, and will sink three shafts. Frank J. Claypool, T. A. Neeley, I. T. Lake and G. A. Munsfield are the chief promoters. The company's principal office is in Muncie.

SULLIVAN COUNTY.

(From Our Special Correspondent.)

J. Smith Talley, of Terre Haute, has purchased 7,000 acres of coal land in Cass Township for $250,000. The entire tract will be developed at once. It is said that Eastern men are interested, and 6 large shafts will be sunk.

New Kettle Creek Coal Mining Company.—This company will open mines in this county. The capital stock is $240,000. The principal office will be at Shelburn, and shaft sinking will begin soon. Cyrus E. Davis, William L. Staley, Lincoln Dixon and William H. O'Brien are the incorporators.

KENTUCKY.

HOPKINS COUNTY.

A perpetual injunction was recently granted by Judge Evans in the Federal District Court at Louisville, against the United Mine Workers, prohibiting them from interfering with employees of the Reinecke and St. Bernard Mining companies.

LOUISIANA.

ACADIA PARISH.

(From Our Special Correspondent.)

Jennings Oil Field.—Equitable Oil Company, a new corporation with $50,000 capital, has purchased property, and will drill several wells. The Western Oil Company, capital $250,000, recently incorporated, and has purchased 8 acres of land for $12,000, and has contracted for drilling.

Superior Oil Company No. 1 has been brought in, and extends the proven field a half mile west. Morse Oil Company's Nos. 1 and 2 came in a day apart, and are flowing freely; both are 6-in. wells, near Southern No. 3. Crowley Oil and Mineral Company No. 3 is said to be producing 3,700 bbls. daily.

Lion Oil Company has contracted for 6 wells on its 3-acre tract. The Rowson Habel Oil Company, a new corporation with $10,000 capital, is drilling a well. The new producers have greatly increased the capacity of the field. Crude is steady at 90c., f.o.b.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Arcadian.—Mining is confined to the Douglas shaft, which is sinking to the 11th level. The lode is very bunchy. One head at the mill at Grosse Point is in commission, stamping rock from the Trimountain Mine.

Atlantic.—The production in May was 327.5 tons of mineral, the largest for any month in its history. The rock from the lower levels is improving in mineral content.

Isle Royale Consolidated.—This mine produced 100.5 tons of refined copper in May.

Osceola Consolidated.—Capt. Richard Edwards has resigned as head mining captain of the Osceola branch and is succeeded by Capt. Tom Edwards, of the Franklin Junior branch of the Franklin Mine.

Quincy.—No. 8 shaft, on the Mesnard property, is sinking to the 17th level at a depth of 2,350 ft. Four power drills are in commission ,and rock shipments average 150 tons daily.

Tamarack.—This mine produced 650 tons of refined copper in May.

Trimountain.—No. 1 shaft at this mine has reached the 11th level, No. 2 the 10th level, No. 3 the 9th level and No. 4 the 4th level. The product in May was 525 tons of refined copper.

Wolverine.—No. 3 shaft is sinking to the 25th level and No. 4 shaft to the 21st level. Twenty-five drills are in commission, and openings in new ground average 600 ft. a month.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Ahmeek.—The Kearsarge amygdaloid lode, encountered in the cross-cut from the exploratory shaft last week, is reported opening up well. The property comprises 920 acres and was set aside from the Seneca, lying next north, in 1880. A. S. Bigelow, of Boston, is president, and W. J. Ladd, of Boston, is secretary and treasurer.

Allouez.—Sinking in the new 3-compartment shaft to open the Kearsarge lode is progressing rapidly. Operations on the Allouez conglomerate have been partially suspended for the present, and the force transferred to the new shaft.

Mohawk.—Sinking is confined to Nos. 2 and 4 shafts. No. 2 shaft is below the 7th level, and No. 4 below the 6th level. The greater portion of the rock stamped comes from Nos. 1 and 2 shafts. Thirty drills are in commission.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure Consolidated.—The May production was 150 tons of refined copper.

Mass Consolidated.—The production in May was 100 tons of refined copper.

Michigan.—The Minnesota conglomerate has been encountered through a winze from the 12th level cross-cut from B shaft.

MINNESOTA.

(From Our Special Correspondent.)

The average cargo taken from Two Harbors in May was 5,331 gross, 6,071 net tons, and there were 162 cargoes of this average.

In one 10-hour day recently 876 cars of ore, about 27,000 gross tons, were unloaded into the docks, this breaking all previous records.

The Duluth, Missabe & Northern road, which, in spite of the purchase of several heavy locomotives, is short of power, has leased several from the Algoma Central, and these are being delivered from Sault Ste. Marie.

Republic Iron and Steel Company.—This company has begun shipping its 50,000-ton Victoria stock pile, which has been on surface for four or five years. All other shafts are shipping steadily and rapidly, and the company's output from the Mesabi this year will be the largest yet. It is now operating the Republic group, including the Republic, Bessemer, Victoria and half the Union, the Pettit, and the Kinney. The latter is an open pit property.

Stephens.—This mine, on the line of the Duluth & Iron Range road, under lease to the Oliver Iron Mining Company, has begun shipping, with one shovel in ore, after two years of preparation. The mine is one of the very large properties of the range, and is sure to make as heavy a shipping record as its operators desire. The ore is of good quality, and the lease is at 15c. a ton with an annual minimum of 100,000 tons. The mine is an open pit, and an immense amount of stripping has been done. The arrangements for the comfort and convenience of the employees are, as at all United States Steel Corporation mines, adequate and excellent. This is the most easterly large property on the range, and is but 51 miles from the lake.

MONTANA.

BROADWATER COUNTY.

Doggett.—A very rich strike is reported in this property, near Diamond City. The property was taken over some time ago by an Eastern syndicate, headed by J. Campbell Cory, of Helena, formerly of New York City, who is manager.

CHOTEAU COUNTY.

Little Rockies.—Satisfactory progress is reported on the cyanide mill, near Landusky. The mill is for E. W. King, and is expected to be in operation during July.

FLATHEAD COUNTY.

American Kootenai.—The 10-stamp mill at Cabinet, in the West Fisher District, is running 24 hours a day. G. M. Blackwell has charge of the mill. S. J. Morris is manager.

Mustang Consolidated Mining Company.—Operations have been suspended for a short time on this company's Alabama claim at Cabinet on account of water in the tunnel; about 200 ft. of work has been done. G. E. Shawles is manager.

MADISON COUNTY.

Clipper.—This mine, near Pony, is shipping about 84 tons daily and about 40 miners are employed. Mr. Carson is superintendent.

Proctor Knott.—This group of three claims, about 3 miles from Perry, is reported sold to the Consolidated Copper Company, of Minneapolis, Minn., for $50,000. The Proctor Knott claim has been developed to a depth of 300 ft.

Speculator Mining Company.—A site is being surveyed on this company's Fourth of July claim, near Pony, for a mill.

Strawberry.—The showing at this property, near Pony, is said to be excellent since the contract work in the drift was undertaken. W. W. Morris is superintendent.

U. S. Grant.—This mine, at Virginia City, is reported sold to a Chicago syndicate for $20,000, of which $10,000 cash has been paid. John M. King was the owner. The Chicago people, represented by L. D. McCaul, may erect a 50-stamp mill.

MISSOULA COUNTY.

Monitor-Richmond.—It is reported that negotiations are pending for the construction of a $250,000 smelter, near Saltese, during the summer.

SILVER BOW BOUNTY.

Nipper Consolidated Company.—Permission has been granted by Judge Clancy to this company to explore and survey the Adventure, Rialto Dives and Midnight claims, and four other mines belonging to the Parrot Company for the purpose of ascertaining whether the company is mining on the Nipper vein, as claimed by Heinze. The Parrot Company will take the matter to the Supreme Court.

Original.—A large air compressor is to be installed in this mine at Butte by Senator W. A. Clark, the owner. The contract for the plant has been awarded to S. G. Murray, Western representative of the Ingersoll-Sergeant Drill Company.

NEVADA.

ELKO COUNTY.

Dexter Mining Company.—Contracts have been let for the installation of a Moore slimes plant at this company's works at Tuscarora, similar to that installed by the Consolidated Mercur Mining Company at Mercur, Utah. E. O. Lee is managing director.

NEW MEXICO.

COLFAX COUNTY.

Confidence.—This mine is closed, pending the arrival of new machinery. The shaft is 400 ft. deep, and has cut the vein. The company intends moving its mill to the mine.

GRANT COUNTY.

Michigan-New Mexico Copper Company.—A 50-h.p. double-cylinder steam hoist is to be installed on the Decorah-Pearl Mine at Lordsburg. A contract has been let to sink 100 ft., and the company intends to sink to 500 ft., and then erect a 50-ton leaching and cyanide plant. W. H. Stevens is superintendent.

National Gold and Silver Mining Company.—It is said that this company has purchased outright the properties of the Mineral Mountain Company in the Stein's Peak Range, near Stein's Pass.

NEW YORK.

ESSEX COUNTY.

American Graphite Company.—This company is enlarging its refining plant near Ticonderoga. It is reported that the Lake Shore mine and mill will soon be started.

Columbia Graphite Company.—George W. Stewart, superintendent, is sinking a shaft on the Towns property, near Ticonderoga. A survey has been made for a mill, which, it is expected, will be erected soon.

Ticonderoga Graphite Company.—This company is installing new machinery, consisting of an 18-stamp mill, crusher, screens, etc., near Ticonderoga. W. W. Jeffers, assistant general manager, has charge of the work.

NORTH CAROLINA.

UNION COUNTY.

Colossus.—Four of the 150-ton cyanide tanks at this gold mine, near Washaw, were wrecked recently by the supporting framework giving way. The tanks were full of ore. It is said the loss will be about $,000.

OREGON.

BAKER COUNTY.

(*From Our Special Correspondent.*)

Alpine.—Manager J. T. Grayson has placed an order for a 20-stamp mill, to be delivered this summer, with 8 concentrators.

Auburn Deep Mining Company.—Sinking has begun on a deep placer mining project. J. E. Reed, Sumpter, is manager.

Badger.—F. W. Bradley, consulting engineer for the property, has been at the mine.

Baisley-Elkhorn.—President F. P. Hayes, Baker City, has stated that 10 car-loads of machinery are en route for the mine, and 8,000 ft. of pipe are purchased for the long cross-cut tunnel.

California.—Work is resumed this week on the 70-ton concentrator. R. L. Bellman, of Sumpter, is manager.

Maid of Erin.—The 10-stamp mill, concentrators and lighting plant, are about finished. Water power is used. C. P. Barrows, of Richland, is manager.

Psyche.—The 20-stamp mill, W. W. Elmer, of Greenhorn, superintendent, is running.

PENNSYLVANIA.

ANTHRACITE COAL.

Representatives of the United Mine Workers in convention at Scranton on June 16, ratified the appointment of the three district presidents as representatives of the miners on the Conciliation Committee. President Mitchell's advice was peaceful. The action of the convention removes the danger of a strike.

G. B. Markle & Co.—This firm is sinking a new shaft on the Keiper tract, northwest of Hazelton. The new colliery will furnish work to 400 men.

Maple Hill.—This colliery, near Mahonoy City, is to sink a new shaft about 1,200 ft. deep, which, it is said, will be one of the deepest in the Schuylkill region.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Big Four Mining Company.—Excavations are being made for the new plant. There is a steam hoist, with boilers, an air compressor, air drills and electric lighting plant. The shaft will be put down 500 ft. It is at present 100 ft. deep. The proposition to reduce the par value of the shares from $500 to $1 was abandoned. The company is capitalized at $1,000,000. J. P. Beach is general manager and P. T. Baird superintendent, with headquarters at Deadwood.

Spearfish Gold Mining and Reduction Company.—A bar of bullion worth $15,000 has just been deposited in the United States Assay Office at Deadwood, the output of a 10 days' run at the cyanide plant. The company has paid a 1c. dividend on the preferred stock, 900,000 shares, for June. The April and May dividends were passed.

Wasp Number Two Mining Company.—M. E. Hiltner, from Lincoln, Neb., is chemist in charge of the cyanide plant on Yellow Creek, suceeding C. C. Griggs, who goes to the Horseshoe Mill, in Ruby Basin. Mr. Hiltner was for a long time chemist in charge of the Portland cyanide plant, and was afterwards professor of chemistry at the University of Nebraska. Mr. Griggs has been in charge of the Wasp No. 2 Mill nearly three years. He will have charge of the large Mogul 500-ton plant of the Horseshoe.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Central Black Hills Copper Company.—The machinery is reported all set at the new copper leaching plant.

Chilkoot.—The last payment has been made by the purchasers to the original owners, Alexander Madill, Thomas Blair and Frank Lockhart, and the new owners are preparing for work.

Holy Terror Mining Company.—The 20-stamp mill formerly belonging to the Keystone, is running steadily. The concentrates will be shipped to a smelter.

Lakota Gold Mining and Reduction Company.—The old Grizzly Bear Mine is being cleared of the debris of years of idleness, by this company, organized last year by Peoria, Ill., men. The old 10-stamp mill has been torn down, and the company is preparing to build a 20-stamp mill on the old site, to be connected with the mine by aerial tramway. The old mine workings have been extended.

Tykoon Mining Company.—A large party of stockholders from Iowa and Illinois has been inspecting the property. A 10-stamp mill on the ground is to be enlarged. During the last year and a half a lot of new mining machinery has been installed.

TENNESSEE.

MAURY COUNTY.

The phosphate mines are more active than for the past three years. It is estimated that about 5,000 miners are engaged in the phosphate industry, over 3,000 of whom are in the mines, near Mt. Pleasant. About 50 cars are shipped daily from this point.

TEXAS.

HARDIN COUNTY.

(*From Our Special Correspondent.*)

Sour Lake Oil Field.—Texas Company No. 8 is in, and throws a 6-in. stream above the derrick. The company's pipe line from here to Beaumont is finished. The Britton Oil Company will operate in this field. John A. Gilbert has a new gusher, said to be equal to any in the field.

R. E. & C. W. Brooks have purchased 28 acres of the Wert Davis tract, and are dividing it into small tracts. Proven oil land is selling at from $20,000 to $50,000 per acre, according to location, and many new derricks are going up in spite of bad transportation facilities. Crude sells at 50 to 60c. per bbl.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Beaumont Oil Field.—Stillwell Oil Company No. 3 at Port Arthur is down 600 ft. T. C. Stribling gusher No. 1 has been sold for $40,000 cash to a Beaumont syndicate, managed by W. A. Meagher. The output is being handled by the Guffey Petroleum Company. Mr. Stribling is drilling 2 more wells. Higgins gusher No. 1 is said to be doing 5,000 bls. daily, which is satisfactory at 70c. a bbl.

Four gushers have been brought in in the new part of the field, and all are big producers. It will be developed with a rush, for already 35 derricks have been erected and more are to be built. The question as to the advisability of permitting the use of the rotary drill (the use of which is enjoined in the old part of Spindletop) will doubtless arise, and it is to be hoped that operators will not repeat the costly mistakes of 1902. Oil is not quite so steady, but still holds at 78c. The increase in producing wells here and at Jennings and Sour Lake causes buyers to hold off for lower prices.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Shipments.—Salt Lake banks made settlements during the week ending June 13 as follows: Gold, lead, silver and copper ores, $157,100; base bullion, $155,600; gold bars, $6,800; total, $319,500.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Imperial Copper Company.—The Antelope springs, near Frisco, have been acquired, and is an important addition to the company's holdings, as water is scarce.

Majestic.—Manager Farish reports on the 200-ft. level of the O. K. Mine, a vein 96 ft. wide between a granite hanging and a quartzite foot wall. About one-fifth of the vein is of smelting grade.

Newhouse Mines.—Estimates are being received to furnish 12 miles of 20-in. pipe to convey water from Wah Wah Springs to the proposed smelter and town site near the Cactus Mine. A 40-ft. vein of ore has been tapped at 147 ft. from the shaft. The ore is like that found in other parts of the mine.

Royal.—President A. B. Lewis has secured for this company the Wild Bill and Burning Moscow properties on a bond, it is said, of $150,000.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Ore Shipments.—Shipments for the week ending June 13 were 124 cars, as follows: Ajax, 2; Bullion-Beck, 1; Carisa, 1; Centennial-Eureka, 29; Dragon Iron, 19; Eagle & Blue Bell, 2; Eureka-Hill, Gemini, 12; Grand Central, 15; Joe Bowers, 2; Lower Mammoth, 4; Mammoth, 2; Martha Washington, 2; Star Consolidated, 9; Uncle Sam, 6; Victor Consolidated, 3; Yankee Consolidated, 5.

May Day.—The new concentrating plant, with six jigs, will start very soon.

Uncle Sam.—This mine marketed eight cars of good ore on June 11. The company has not completed arrangements for water, hence the construction of the mill is delayed.

PIUTE COUNTY.

(*From Our Special Correspondent.*)

Mammoth.—Work has been resumed in the lower tunnel, which will cut the main ledge in about 500 ft. James Long, Jr., of Kimberly, is manager.

Sevier.—Machinery is being installed in the reconstructed mill.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Shipments.—For the week ending June 13, exclusive of companies owning their own smelters, shipments were: Brooklyn, 2 cars; Sampson, 2; Washington, 1; Rodgers, 1; Columbia Copper, 4; United States (lease), 3.

Bingham Consolidated.—Shipments of copper bullion this week were 4 cars, 241,000 lbs. It is announced that the fourth stack will soon blow-in, and that the smelter will soon be treating 700 tons daily. From the Dalton & Lark tunnel is running 4,000 gals. of water per minute, draining the best ground belonging to the company. Manager McVichie says three-fourths of the ore supply will come from ground made available by this tunnel.

Columbus Consolidated.—Preliminary surveys for the 500-h.p. electric power plant are completed. The works will be in Little Cottonwood Canyon, 4½ miles below the mine, at Alta, A 20-in. pipe will carry the water to the wheel house, about 4,200 ft. distant, giving a head of about 500 ft. Plans for the new plant are being drawn, and Manager Tony Jacobson, of Salt Lake, will soon be ready to receive bids for construction and equipment.

Continental Smelting and Securities Company.—Henry M. Crowther, of Salt Lake, announces the formation of this corporation, articles to be filed in New Jersey, with offices in New York and Salt Lake.

Capital, $1,000,000, in 100,000 shares. H. F. Albers and Guy C. Van Alstyne are the principal New York men interested. Mr. Crowther will be field manager. The company proposes to conduct a general mining business.

Tintic Mining and Development Company.—Work on the excavations for the Yampa Smelter at Bingham is nearing completion. The ore will be delivered by the Copper Belt Railway, which will extend its lines to the mine.

United States Smelter.—Three cars of copper bullion were shipped in the week ending June 13, amounting to 180,000 lbs.

Utah Consolidated.—George K. Fischer will have charge of enlarging the smelter at Murray. He designed the present plant. It has been decided to increase the capacity 250 tons per day. Shipments of copper bullion for the week ending June 13 were 5 cars, 301,000 lbs.

Utah Copper Company.—This company recently organized under Colorado laws, has acquired the De La Mar-Wall group at Bingham, Col. Wall retaining one-fifth of the stock. The officers present to close negotiations in Salt Lake were: C. M. McNeill, president; Spencer Penrose, secretary and treasurer; R. A. F. Penrose, Jr., C. L. Tutt and D. C. Jackling. The company will erect a 500-ton concentrator in the near future.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—Shipments for the week ending June 13 were 4,232,540 lbs., as follows: Comstock, 90,000 lbs.; Daly West, 2,571,000 lbs.; Silver King, 1,611,540 lbs.; Barnes Brothers, 60,000 lbs.

American Flag.—The shaft at this Park City mine has reached 600 ft. Capt. Singiser, of Salt Lake, is president.

Daly-Judge Mill.—This plant, equipped with the Sherman slimes settling tanks, is ready to go into commission again.

Keith-Kearns Mill.—The contract for machinery has been awarded to the Mine and Smelter Supply Company, through its Salt Lake branch. The delivery is to be made with 60 days.

Lucky Bill.—At the annual meeting on June 10 the officers chosen were: President, Solon Spiro; vice-president, Louis E. Bamberger; treasurer, Simon Bamberger; secretary, Joshua Bean; these and James H. Moyle, Elias A. Smith and A. D. Pierson, of Salt Lake, directors. The headquarters were changed to Salt Lake City. The property adjoins the Daly-Judge. Work will be resumed soon. A shaft has been sunk 1,000 ft.

New York Bonanza.—The shaft, 340 ft. deep, is still sinking. Some trouble has been experienced with water.

St. Louis-Vassar.—A 4-ft. ore-body has been encountered 50 ft. northwest of the bottom of the winze. The property lies south of the Daly-Judge.

TOOELE COUNTY.

(From Our Special Correspondent.)

Ophir Shipments.—The Ophir-Hill Mine marketed 17 cars of concentrates in the week ending June 13.

Consolidated Mercur.—Work of installing the Moore slimes process is progressing favorably. Manager George H. Dern says the plant will be ready for commission by July 1.

Sacramento.—This Mercur Company has its retorts reducing the quicksilver-bearing ores.

WASHINGTON COUNTY.

(From Our Special Correspondent.)

Utah and Eastern.—Manager J. A. Beveridge, of St. George, states that the developments at the Dixie Mine will justify the enlargement of the present smelter.

WEST VIRGINIA.

BARBOUR COUNTY.

Negotiations were closed recently whereby Pittsburg men secured 3,500 acres of coal land 5 miles south of Phillippi for $91,000. The options were secured by Irwin & Noble, of Claysville, Pa. Three veins run through the property—the upper and lower Freeport and the Sewickley—ranging from 4 to 9 ft. thick, all of drift coal. The property will have good rail facilities when the Baltimore & Ohio line from Grafton to Bealington and the Wabash road from Fairmount to Bealington are completed.

MERCER COUNTY.

Pocahontas Collieries Company.—This company is opening a new mine on Laurel Creek, about 3½ miles from Pocahontas, to which an extension of the Norfolk & Western from Pocahontas will be built. Contracts will soon be let for a commissary, tipples, hotel, houses, coke ovens, etc.

Zenith Coal and Coke Company.—This company, organized a few months ago, is making rapid progress with the construction of its colliery. Compressed air and electrical machinery are being installed. W. H. Coffman is president and general manager.

WISCONSIN.

DOUGLAS COUNTY.

(From Our Special Correspondent.)

John W. Gates, of Chicago, who has for nearly a year been exploring on the amygdaloid out-croppings back of Superior, has stopped work and abandoned the properties. The fee owners state they will continue. Mr. Gates spent nearly $25,000, and did careful work, exposing copper in many places. The formation is supposed to be too bunchy.

FOREIGN MINING NEWS.

ASIA.

INDIA—MYSORE.

Kolar Gold-field.—The output of the mines in this field in the month of May is reported at 48,628 oz. crude; a figure which has been exceeded on two previous months only. For the five months ending May 31 the total was 239,574 oz. crude, against 189,662 oz. in the corresponding period in 1902; an increase of 49,912 oz., or 26.3 per cent. The total this year was equal to 215,617 oz. fine gold, or $4,456,803.

AUSTRALIA.

QUEENSLAND.

The Mines Department reports for April a production of 67,562 oz. bullion, equal to 50,023 oz. fine gold. This compares with 47,692 oz. in April, 1902, showing an increase of 2,331 oz., or 4.9 per cent. Dividends of gold mining companies reported during the month amounted to £77,042; calls on stock to £28,070.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Shipments.—The ore shipments for the week ending June 6 were: Granby mines to Granby smelter, 4,396 tons; Snowshoe to Greenwood and Sunset smelters, 1,890; Mother Lode to Greenwood smelter, 2,976; Sunset to Sunset smelter, 384; B. C. Mine to Greenwood and Sunset smelters, 1,260; Emma to Granby smelter, 540; total for the week, 11,446 tons; for the year to date, 225,557 tons. The Granby smelter treated 4,802 tons, making a total for the year, 135,331 tons. Only five blast furnaces are running, owing to a continued shortage of coke.

BRITISH COLUMBIA—EAST KOOTENAY DISTRICT.

Crow's Nest Pass Coal Company.—Extensive developments of the Morrissey coal mines have been planned by General Manager Tonkin. A tail rope haulage engine is to be installed at the head of the incline for hauling empty and loaded cars, also a new track scale for weighing cars of coal as they come from the mine. An order for 200 additional mine cars has been given, and an 18-ft. exhaust fan is to be installed, to ventilate No. 2 and No. 3 tunnels. A new tunnel is to be run to cut No. 2 vein and a contract has been let to drive a cross-cut to connect No. 2 with No. 3 tunnel. Work on 500 additional coke ovens is to start on completion of the 250 now being built. The new ovens, it is estimated, will cost about $500,000.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Shipments.—The ore shipments for the week ending June 6 were: Le Roi, 3,570 tons; Center Star, 1,440; War Eagle, 1,380; Le Roi No. 2, 735; White Bear, 30; Velvet, 100; Kootenay, 300; total for the week, 7,535 tons, and for the year to date, 156,707 tons.

MINING STOCKS.

(Full quotations are given on pages 954 and 955.)

June 17.

The coppers have rallied somewhat this week, but there is still a heavy feeling as a result of inside manipulation. Evidently professional traders are on the alert, and await the opportune moment to inaugurate a boom movement in prices. Of course, Amalgamated is expected to lead, and already bait has been thrown out in the shape of bids for a 1 per cent dividend next quarter. In short, the situation from a financial standpoint will have to be greatly improved before the public can be induced to buy these shares in any quantity. Meanwhile, speculators can keep busy paring profits from the fractional fluctuations in prices.

Amalgamated advanced from $53¾@$56⅝, but subsequently reacted to $52¾ on freer offerings, while Anaconda was bought at $21.53@$22, which is below par. On curb the copper shares were aggravatingly quiet, and certain specialties were even dull, as their supporters had turned their attention to other more profitable speculation. Greene Consolidated, of Mexico, weakened to $20¾ on sales of small lots. Tennessee brought $29¾; United, of Montana, $18¼@$18; White Knob, of Idaho, $15½@$14¾, and British Columbia, $4⅝$4⅜.

In the gold and silver list trading is confined to brokers who match orders, and whenever possible take small profits. Of the Comstock stocks, Best & Belcher sold at $1.80@$1.85; Hale & Norcross, 68c., and Potosi, 39c. Since January there have been 24 Comstock companies that levied assessments of 3 to 25c. per share, amounting to $462,652. Few Colorado stocks are being dealt in, primarily because there is still some uncertainity in the Western market. Sales this week included Elkton Consolidated, of Cripple Creek, at 44c., and Isabella at 17@17½c.

Recently there were sold at auction 2,500 common and 100 preferred shares of the United Gold and Platinum Mines Company, par value $100, at $100 for lot; 100 shares Peacock Copper Company, California, at $24 lot; $4,000 7 per cent special contract bonds, and 400 shares Poland Mining Company, of Arizona, at $89.50; 160 shares and $1,600 6 per cent special contract bonds Tombstone Consolidated Mines Company, of Arizona, at $99.50.

Boston. June 16.

(From Our Special Correspondent.)

Copper mining shares continue to follow the trend of Amalgamated Copper, which is dominated by the New York stock market. This has been the case, and to all outward appearances is likely to continue so. Prices this week sagged to a lower level, but, in the majority of cases, stocks are above the quotations of a week ago. Copper Range Consolidated touched $55.87½, but fell back to $51.25, closing $2.25 above a week ago at $53.37½. Utah Consolidated advanced $2.27½ to $30.87½, but closed at $20.50. Now that the company has been taken over by an American corporation, the management will increase its smelting capacity from earnings. Utah has been absorbed by strong interests, and now stands in the names of Standard Oil interests, including the Lewisohn's. Osceola rose $4 to $58.50, but fell back to $53.75. The directors, including one of the newly elected Lake gentlemen, held a meeting this week, and as a result it is announced that dividend payments will be deferred until December. Osceola's May profits are estimated at $65,000. Quincy is quiet around $100. The talk is that Quincy's next dividend will be $3.50, semi-annually. Calumet & Hecla took a $20 drop to $450, with nothing between. There was no significance to this decline, as it easily is recovered to $475. Calumet people are reported strong on the copper situation.

The $16.50 advance in Dominion Coal to $92, and subsequent reaction to $85, simply denotes the feeling in the market. It is felt that this company will sooner or later be divorced from the Dominion Iron and Steel Company. The latter did not pay the $400,000 due the Coal Company June 1, under the terms of the lease, and this will facilitate the separation. Dominion Iron and Steel has varied from $11.75 to $14. The May output of the latter was 14,500 tons of steel and 17,800 tons of pig iron.

Bingham Consolidated rose $3.50 to $28.75, reacting $1.50. Talk on Bingham is very strong, and some important developments are looked for soon. Trimountain has risen $7 to $90; Wolverine, $3 to $67.50, and Tamarack $10 to $120.

The selling pressure being over in United States Coal and Oil, the stock recovered $1.50 to $12.25. United States Mining sold up $3 to $22.75, reacting to $21.

Old Dominion Mining settled $1.50 to $12.50, but recovered to $15, closing at $13.75. President Smith is now at the mine, and the strike at the property has been adjusted. Centennial enjoyed a rise of $3.50 to $23, and closes to-night at $19.75. The stock moves rapidly, and is a favorite with the traders. Daly West, the silver mine, sold up $2 to $44, but lost it. Mohawk rose $3 to $45.75, reacting to $44. Parrot advanced $1.50 to $23, and Winona $1.75 to $10. Mass has gone up $1.12½ to $7.50, and Atlantic $1 to $10. Allouez has been firm at $6@$6.75. The special meeting has been changed to July 7 to act upon the proposition to exchange land with the Ahmeek Company. Santa Fe is selling around $1.50. There is understood to be no immediate prospect of either active mining or smelting, on account of high costs.

Colorado Springs. June 12.

(From Our Special Correspondent.)

A fairly good week is shown in mining circles, with the tendency downward in the mines list. In the prospect department there was marked activity. Monday opened with the market on about the same general level as Saturday preceding, with but little disposition to do business. By Tuesday, however, this had all changed, and an incipient boom was in progress, which was of short duration, the market lapsing into a state of lassitude the day following, and remaining under this temper for the balance of the week. C. K. & N. held well, selling from day to day at 20c. on continued good reports from the mine. El Paso showed a gradual weakening from 63 to 61c., due in the main to apathy on the part of the clique which has always been ready to back these shares. Isabella was the feature of the week. It develops that

some of the directors have secretly disposed of their holdings before making the announcement of the suspension of work to the stockholders. The stock was weak, selling from 16@15½c., closing to-day at 15c. bid and 15½c. asked.

Old Gold opened the week at 7¾c., and closes to-day at 7⅜c., while its neighbor, Mary Nevin, strengthened to 4c., and sagged off to-day to 3¾c. Little Nell advanced from 3@4c., holding at the latter point the balance of the week.

Salt Lake City. June 13.

(From Our Special Correspondent.)

The market has been dull and sluggish. Nearly all stock are down. The business transacted on the Salt Lake Exchange amounted to 209,865 shares for $141,486.

Lower Mammoth went up to $1.20, and dropped down as low as 87½c., stiffening at the close to 91c. The heavy buyers of the past few weeks have stopped after securing about two-thirds of the stock. They were well known Salt Lake mining men. Among the causes of the slump was the fact that the ore on the 1,100 level, the point from which several rich shipments have been taken lately, has cut into Black Jack ground. This is likely to precipitate trouble with the latter, unless a consolidation of the two mines is effected. During the week 60,800 shares were transferred. Star Consolidated was another heavy Tintic seller; 46,650 shares going from 28c. down to 25½c. May Day and Uncle Sam Consolidated also showed shrinkage. Consolidated Mercur shows signs of advancing; the mill will be ready to start up again by July 1, equipped with the Moore slimes process. Sacramento, the other active Mercur stock, was also stronger. Of the Park City stocks, Daly-Judge maintained steady prices; Daly West dropped to $40.40, but stiffened, closing the week with $42.75 bid. The dividend will be distributed June 15: the amount is 60c. per share, or $108,000. Silver King paid $100,000 June 10.

San Francisco. June 13.

(From Our Special Correspondent.)

The market was rather dull on the old exchange, with prices somewhat weaker. Consolidated California & Virginia sold at $1.60; Mexican, $1.25; Sierra Nevada, 85c.; Potosi, 37c.

On the San Francisco & Tonopah Exchange the trading was active, and many shares changed hands. Prices were generally steady. Tonopah North Star brought 50c.; Colehan, 30c.; Gipsy Queen, 27c.; Gold Mountain Consolidated, 24c.

The sworn statements of the mining companies were filed in their offices this week. The following companies report cash on hand June 1, as below, with all expenses paid to that date, unless otherwise mentioned: Andes, $1,553, with balance of $532 due on electric hoist contract; Belcher, $12,132, with liabilities of $1,000; Best & Belcher, $2,758, with bills payable of $5,000 on mill purchase account; Bullion, $1,618; Caledonia, $3,194, with mining expenses for May unpaid; Consolidated California & Virginia, $23,370; Chollar, $5,248; Confidence, $4,414, with balance of assessment to be collected and May expenses at mine unpaid; Challenge Consolidated, $327; Consolidated Imperial, $1,649; Crown Point, $5,763; Gould & Curry, $9,790, with bills receivable of $5,000; Justice, $608, with May expenses at mine unpaid; Ophir, $7,736; Overman, $4,990, with May expenses at mine unpaid; Potosi, $4,941; Savage, $394; Sierra Nevada, $4,358; Standard Consolidated, $90,461, with May expenses at the mine and bullion clean-up to be accounted for; Silver Hill, $25,282; Segregated Belcher, $1,610; Union Consolidated, $422; Utah, $56, with $3,300 due on company's notes.

The following companies report an indebtedness on June 1, with no cash: Alta, $1,377; Mexican, $2,451; Lady Washington, $927.

In oil stocks business was good and prices showed a steady tone. The higher-priced stocks were in more demand. Pearless sold at $14.50; Twenty-eight, $4.20; Home, $2.80@$3; Monarch, 57c.

On the California Stock and Oil Exchange the monthly record of sales since January 1, 1903, is as follows:

	Shares.	Value.
January	267,019	$255,202
February	322,443	219,358
March	199,908	151,982
April	236,268	115,571
May	401,454	154,386
Totals	1,427,092	$896,499

May showed the heaviest business of the year, so far as the number of shares is concerned; though the value was less than in January and February.

COAL TRADE REVIEW.

ANTHRACITE.

New York, June 18.

The Congressman-elect from New York, who has for his political ends, through the Interstate Commerce Commission, been fishing for information that might be used in a suit against the anthracite railroads under the Sherman act, has met with a rebuff. Judge Lacombe, of the United States Circuit Court, last week decided that the Commission had not the power to inquire into coal purchases or to investigate trade matters other than interstate traffic; furthermore, the judge expressed an opinion that complaints of discrimination or excessive rates should be made by a shipper of coal not by some philanthropist after notoriety, who was only a purchaser of coal. As it is a matter of common report in the trade that a certain independent operator in the Wyoming region, known for his ever-ready willingness to manage other people's affairs, furnished the attorney for the plaintiff with considerable ammunition for the contest before the Interstate Commerce Commission, there is some curiosity as to whether this individual will come forward as a plaintiff or whether the suit will be abandoned. As a matter of fact, it is now pretty clear that a desire of certain members of the Commission for notoriety may have influenced the Commission in taking up the Hearst charges.

John Mitchell showed his hand in the convention at Scranton when he told the delegates that they must stick to the union. It is said in trade circles that all the talk about strike and all the indignation expressed about the operators' attitude were part of a scheme of the leaders of the Mine Workers to show the men that they could not hope to do anything without the help of leaders. However that may be, it is tolerably clear that there was not any real danger of a strike.

The demand for anthracite continues very brisk from all over the country, and premiums are paid for prompt deliveries. In Lake Superior territory more anthracite is arriving by Lake, but shipments from the docks are steady, and buying is unusually active for this season of the year. In Chicago territory dealers report a demand ahead of their ability to meet, buying at country points being heavy. Cold, raw weather doubtless had its effect on retail buying, and premiums have been offered for quick delivery. Trade along the lower lakes and in Canadian territory is active, and independent producers are reported securing bonuses of 25c. a ton and over for prompt shipment. Strike talk has been responsible for some of this activity. At seaboard points there are still many dealers seeking supplies, and retail business has profited from the unseasonably cold, damp weather. The demand from points beyond Cape Cod continues very strong. It is evident that production will need to be heavy all summer. Egg is the size most in demand all over the country.

BITUMINOUS.

The Atlantic seaboard bituminous trade is improving slowly, and prices grow firmer, but as yet there is no great activity in forwarding coal. Car supply at the mines continues rather poor, though the railroads are very strict in enforcing demurrage charges on coal allowed to stand in cars at tidewater. A factor that is bound to lead to increased shipments is the downward tendency in vessel rates for coastwise shipments.

There are labor troubles in West Virginia, but they amount to little in districts shipping to tidewater, and are not likely to spread in view of the defeat of the Mine Workers at most of the mines in those districts last year.

At points beyond Cape Cod buying improves gradually, and the trade has about recovered from the tonnage dumped on the market some months ago, though a lot of this low-priced coal has gone into storage. Along Long Island Sound ordering is heavier, and for larger amounts. At New York Harbor points there is little change, dealers being able to get coal to meet demands as fast as they want it. In the all-rail trade demand holds up well, any falling off in buying at one point being made up by more orders from another.

Transportation from mines to tide has been hampered somewhat by the rains, but coal comes through inside a week. Car supply at the mines is about 75 per cent of the demand. In the coastwise vessel market bad weather has hindered the movement of vessels. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 75c.; Boston and Salem, 85c.; Portland, Portsmouth and Bath, 90c.

Birmingham. June 15.

(From Our Special Correspondent.)

The convention of the miners to formulate a new scale to take effect July 1 is now on. There is very little intimation given as to what the miners are going to ask, thought rumors have it that their demands will include an advance of 5c. per ton for coal mining, based on the selling price of pig iron; two pay-days per month; eight hours to constitute a day; change in mining rules. The operators will give no intimation as to what they will grant the miners, though a strong sentiment prevails not to make a contract for anything better than the present scale.

There is a strong demand for coal for this season of the year. The railroads are furnishing all the cars needed for prompt handling.

The development in the coal-fields of Alabama continues. The Henderson Coal Company, capitalization $100,000, with headquarters in Birmingham and privilege of holding meetings in Memphis, Tenn., will open mines on an extensive scale in this State.

The production of coke is holding up well. The Sloss-Sheffield Steel and Iron Company's new ovens at Flat Top are ready for operation, and will be lighted at once. Before the end of the year several hundred new coke ovens will have been placed in blast.

Chicago. June 15.

(From Our Special Correspondent.)

Sales of anthracite continue heavy, under the stimulus given by newspaper reports of another strike in the anthracite region. During the last week the effect of this scare in the region west of the Mississippi has been pronounced; orders for anthracite have been pouring in, and the first day of this week shows no abatement of the desire to secure large stocks as early in the season as possible. It is considered significant also by dealers that the local demand is also larger for the middle of the month than any mid-month trade this season. As a rule, the market finds its rush toward the end of the month, but the June price is apparently being sought by everybody, and the experiences of the last two months have warned dealers that their orders must be placed early to be at all certain. Probably, notwithstanding the quieting of the strike rumors, the fear of shortage has given to the anthracite market the stimulus that was needed to bring about the usual heavy spring buying, which had lagged somewhat below the record of previous years in the belief that bituminous would be very largely sought as a substittue for anthracite next winter.

The market for bituminous continues quiet, but fairly good for this season of the year. Country trade is becoming better in smokeless and high-grade bituminous, according to large dealers. The price of smokeless has declined a little, being now $3.60 for Pocahontas, New River and Maryland, on ordinary sales. Locally, both wholesalers and retailers say, less smokeless is being used than was expected before the heavy demand for anthracite set in. Youghiogheny is in steady demand at $3.60@$3.86; Hocking sells well, the demand being good, at $3.50@$3.60. A movement is on foot to restrict the shipments from the mines of Indiana and Illinois, thus preventing the heavy depression in these grades that has existed for the last two weeks. Indiana and Illinois continue to be quoted at $1.75@$2 for lump and $1.45@$1.55 for run-of-mine.

Cleveland. June 17.

(From Our Special Correspondent.)

The coal situation in this territory has continued strong. The advanced buying of the winter supply for domestic use has been very heavy. The fact, however, that gas has come in as a fuel to operate against the coal sales, has made a considerable difference. Prices have been firm. The demand for factory coal has not been quite as strong as formerly, and the market has been easy. The supply has been all that could be desired. Coke for all purposes in this territory has been strong. The best grade of foundry coke is bringing about $4@$4.25, and other grades of coke are shaded down from that. Foundrymen have been rebelling slightly against this price, but it does not seem as if their opposition will amount to much. Consumption at the foundries and at the furnaces has been enormous, as the supply has been equal to all requirements.

The lake coal situation continues to be strong, with the shipments extraordinarily heavy. One indication of this is the fact that boats have been delayed three and four days at the unloading ports, because the upper lake docks have been jammed with coal, and the railroads have not been able to haul it away. The supply of coal on the lakes has been something phenomenal, and at the present rate of speed in shipment the record for the season will be without a parallel. The call for tonnage therefore is good. The rates have held firm. A few more sales have been made at the old prices of $2.45 for Pittsburg and West Virginia lump, and $2.35 for Ohio lump.

Pittsburg. June 17.

(From Our Special Correspondent.)

Coal.—The shortage of railroad cars on Friday and Saturday had a serious effect, as nearly all the mines were forced to close. There was a full supply yesterday and to-day, but the outlook is not particularly encouraging. Prices are unchanged, but in many instances operators are getting better rates if prompt shipment can be guaranteed. Leading operators say it is impossible to handle all the business offered. There was considerable disappointment among river shippers, owing to the failure of the rivers to reach a navigable stage, which had been confidently expected. The Monongahela River Consolidated Coal and Coke Company and the independent interests have fully 25,000,000 bush. of coal loaded ready to go out. In the harbor yesterday towboats were hitched to tows of coal-boats and barges containing about 10,000,000 bush. in anticipation of sufficient water to take them

to down-river ports. Only a few boats got out with light tows, the total shipment being not more than 500,000 bush.

Connellsville Coke.—Prices of coke are not as firm as have ruled during the past few months. Furnace coke is quoted at $3 at the ovens, and it is said this price could be shaded. Foundry coke this week is quoted at $4.25@$4.50. The production, according to the last report of the *Courier*, was 251,122 tons for the previous week, a slight decline. The shipments for the week amounted to 11,693 cars, distributed as follows: To Pittsburg and river tipples, 4,274 cars; to points west of Pittsburg, 5,823 cars; to points east of Connellsville, 1,596 cars. This was a loss compared with the previous weekly report of 29 cars.

Foreign Coal Trade. June 18.

Export trade here continues light, and without any special incident.

Messrs. Hull, Blyth & Co., of Cardiff and London, report under date, June 6, that the tone of the Welsh coal market remains unchanged. Owing to the irregular output, business is still difficult. Prices remain unaltered, as follows: Best Welsh steam coal, $3.78@$3.90; seconds, $3.66; thirds, $3.48; dry coals, $3.30; best Monmouthshire, $3.42@$3.48; seconds, $3.30; best small steam coal, $2.22; seconds, $2.10; other sorts, $1.92.

The above prices for Cardiff coals are all f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2.5 per cent.

The freight market continues unchanged, with very little business passing. Some rates quoted from Cardiff are: Marseilles, $1.45; Genoa, $1.35; Naples, $1.52; Singapore, $2.64; Las Palmas, $1.44; St. Vincent, $1.56; Rio Janeiro, $2.04; Santos, $2.40; Buenos Aires, $1.74.

IRON TRADE REVIEW.

New York, June 18.

The waiting policy seems to be having an effect, and we hear of concessions being offered upon pig iron sales to large consumers. Steel billets, however, are still rather firm, owing to the present scarcity of material. The decline shown in recent sales has strengthened the belief among buyers that a somewhat lower range of prices for raw material will be established, and there seems little doubt that such will be the case.

Not much has been done in bessemer pig, the large consumers being generally supplied for the balance of the year. Foundry iron buyers are doing practically nothing at present, although the foundry business is generally in good shape. No new buying is apparent in the market. Meantime, production of pig is increasing. Among other important changes noted is the blowing in of the big Clairton furnaces which can make some 500 tons a day each.

It is understood that the railmakers will hold a meeting shortly to fix prices for next year, and the general impression is that they will remain at the present figure, $28 per ton for stranded sections at mill. One order for 100,000 tons, 1904 delivery, is reported to have been placed already. The Tennessee Coal, Iron and Railroad Company, which is now running its Ensley mill, will come into the combination. The new mill of the Lackawanna Steel Company, at Buffalo, will also add to the productive capacity.

In other finished material, business has been very quiet. Bar sales have been comparatively light, and the current demand for plates seems to have been satisfied. Structural material is still quiet on account of the troubles in the building trade.

Birmingham. June 15.

(*From Our Special Correspondent.*)

While there has been no rush to enter the market by the consumers, the buying during the past week was healthier than it has been. A representative of one of the furnace companies in this district stated a few days since that an order was offered for 10,000 tons of iron, provided the new schedule of prices was shaved 25 to 50c. per ton, but the offer was declined. This appears to mean that the new prices will be maintained. In reference to a rumor that the new schedule of prices will shortly be affected again: "There are no reasons for a further reduction in prices," said the gentleman seen; "the new prices are a great concession, and the purchasing element must admit it. There are a few sales being made, and as a whole, a larger amount of iron is being sold right now than was sold at this time last month. The indications are that there will be some stronger buying, and before the end of the month, too."

During the past week the Tennessee Coal, Iron and Railroad Company blew in No. 4 furnace at Ensley, which has been undergoing necessary repairs during the past three months. No. 5 furnace at Ensley will go out of blast in the next few days, being in need of repair. The work of improving No. 2 furnace at Thomas, belonging to the Republic Iron and Steel Company, is being pushed. The new stock bins and other arrangements in the stock department of the furnace plant at Thomas will facilitate matters no little in the handling of the raw material, being a labor saving as well as a handier way of getting the product from the railroad cars to the furnace tops.

The following quotations prevail in this district: No. 1 foundry, $15.50; No. 2 foundry, $15; No. 3 foundry, $14.50; No. 4 foundry, $14; gray forge, $14; No. 1 soft, $15.50; No. 2 soft, $15.

A large number of men are still being given employment at the rolling mills and steel plant in this district. At the steel plant the manufacture of steel rails is being pushed.

Chicago. June 15.

(*From Our Special Correspondent.*)

There are signs of an upward tendency in the pig iron market. Orders are somewhat more numerous, and inquiries are decidedly numerous, the buyer apparently seeing that he cannot hold off much longer. Well-informed men in the trade believe that the bottom of the depression has been nearly if not quite reached, and that foundrymen are getting back into their former confidence in the future of the market. For the last week the sales have been, as heretofore for a month, mostly of small lots and for speedy delivery. Quotations for the last quarter are low; No. 2 Southern is nominally at $14.75@$15, Birmingham, or $19.10@$19.35, Chicago; this price is probably shaded on important contracts, by 25@50c. Northern, in small lots for quick delivery, brings $19.50@$20.50, and perhaps a trifle more than Southern on autumn deliveries. Local furnaces are cleaning up old contracts, and their proprietors are getting somewhat anxious about the future. Iron at the present prices does not offer much encouragement to continued operation of furnaces, but there is as yet no talk of blowing out.

Coke also is low; spot business is being done as low as $5 for first-class foundry. Contract coke is in the neighborhood of $6.25@$6.50. All kinds of prices prevail, owing to the great abundance of coke and the needs of dealers.

Cleveland. June 17.

(*From Our Special Correspondent.*)

Iron Ore.—The lake market during the past week has displayed the strong contention between vessel-owners and shippers over wild rates. The vessel-owners have decided to lay up tonnage until an artificial scarcity has been erected. This is done in the hope of restoring the rates. Nevertheless, except at such times as Monday, when a strange shortage of boats occurred, there is enough tonnage on the lakes to enable the shippers to move any amount of material that it is possible to produce without the necessity of advancing the carrying charges greatly. The situation is firm therefore, but not strong with the rates stable at 80c. from the head of the lakes; 70c. from Marquette; and 60c. from Escanaba. The prices of ore have not changed despite the recent discussion of such possibilities. The sales have been light. The quotations are based on $4.50 for bessemer old range; and $4 for bessemer Mesabi.

Pig Iron.—In the foundry situation the consumers have started to inquire for iron for the second half, and the market has taken a sudden brace. The furnaces have been holding for $20, Valley furnace, where possible, but receding from this price when it was found that any business was to be done. No business has been done to fix the price, but it is assured that the price will be $19@$19.50 for No. 2, Valley furnace, for second half. Bessemer has been in very light demand, and the situation is not conducive to heavy selling at the present time. The Association announces that it has sold no material for fourth quarter delivery, but has sold about all of the supply for the third quarter. The market is represented by a quotation of $18.50@$19.35 in the Valleys for second half. Basic has been very quiet, with the market easing up gradually. The furnaces which have any uncovered capacity, instead of selling now, have been waiting for later developments. The market is represented, as nearly as it is possible to get at it now, by a quotation of $18.75, Valley furnace. Production at all stacks has been heavy, and the market has been firm.

Finished Material.—The demand for structural material, both on specifications against former contracts and on new contracts, has been heavy. Some of the jobbers have completed their bargain-counter sales and are again quoting the higher prices for their material. Premiums on mill product do not appear. The quotations have not changed from 1.60c., Pittsburg, from the standard mills; and 2.15@2.25c. for stock material. The bar situation has been weak and iron has been falling. The larger mills are quoting 1.80c., Youngstown. However, it seems settled now that the business—all of it—might be done safely on the basis of 1.70c., Youngstown. Bar steel continues to be strong, though some of the big buyers are still holding back. The prices have not changed from 1.60c., Youngstown, for bessemer, and 1.70c., Youngstown, for open-hearth. The consumers of plates have been easing up in their demand considerably and have caused some of the mills a little uneasiness.

The smaller mills are having some difficulty to get their full quota of premium business, and have been reducing the margins. The highest quotation now is 1.90c., Cleveland, which is being shaded. The standard mills are getting 1.60c$_f$, Pittsburg. The sheet situation is about as it has been, with very little change in either prices or conditions. The market has been firm with a good call for all gauges, but with hardly the business that was being done a short time ago. The prices have not changed materially, being based on 3.15c. for No. 27 black sheets, out of stock; while galvanized sheets are bringing 3.75c. for No. 26 out of stock. The call for rails has been rather heavy, with no business being done. Prices have not changed in the least, being $28 for standard and $26 for light rails, Pittsburg base. There has also been a fair call for billets, but nothing of importance done. The quotation in this territory has been $30@$31 for bessemer.

Philadelphia. June 17.

(*From Our Special Correspondent.*)

Transactions in pig iron are restricted by the most urgent necessities of consumers. The buying side of the market has been disappointed by the stubbornness with which makers hold on to quotations. Those who have been trying to work Southern iron into this market have not succeeded to any extent. The only new feature within a week is the presentation of inquiries for large quantities of material, but as yet there are not actual transactions that are worthy of being recorded. Quotations for pig iron might be shaded, it is claimed, in favor of large consumers, but the latter are not inclined to precipitate orders into the market, and it is even asserted in some quarters here that the month of June will pass without any business to speak of. There is some No. 2 foundry selling, and there is quite an inquiry for forge since Monday, but after all the pig iron situation may be regarded as flat. Quotations are given at $21@$21.50 for No. 1 foundry; an average of $20 for No. 2X; No. 2 plain, $19; gray forge has been sold as low as $18; basic is quoted at $19, with fair prospects for considerable business.

Billets.—A strong effort is being made in some quarters to induce billet makers to yield certain concessions which buyers believe should prevail. Basic open-hearth is quoted at $31, delivered; Canadian steel at $28; neither of these quotations will attract business. The consumption of steel billets is very heavy, and buyers are even anxious to buy, but they say that the market is not yet sufficiently settled.

Merchant Bar.—Merchant bar develops unexpected weakness. It shows itself in the smaller mills in the interior. Some shading has been going on for local business, where there appears to be no more occasion for it than the anxiety of mill owners to secure business, which they fear may slip through their fingers. The larger consumers are not in the market, at least in this territory. Quotations for refined iron are 1.80@1.85c.

Skelp Iron.—Representatives of skelp mills report the placing of about enough business to keep them going nicely.

Sheets.—Sheet demand has fallen to low proportions again, but the mill people say that trade conditions are all they could desire. Card rates are pretty well adhered to.

Merchant Steel.—Inquiry among the consuming interests establishes the fact that there is no likelihood of any falling off in consumptive requirements. Neither is there any truth in the rumor that manufacturers have shaded prices. Tool steel is exceptionally strong.

Pipes and Tubes.—The demand for tubes, taking one week with another, keeps up at a high point. During the past few days a few emergency buyers appeared in the market, and were obliged to pay something more than the prevailing price for the stock they wanted. Pipe of all kinds is very strong, but that is due to the fact that the recent buyers here are insisting upon the quickest possible deliveries.

Plates.—The retail deamnd for plates is as good as it has been any time this year. The orders are mostly for small quantities. The re-affirming of old quotations has settled the matter with a number of buyers, who have been waiting for that announcement before placing orders for large lots. These orders have not yet been placed, but they will be along in a short time. The mills are in somewhat better condition to take care of the trade than they were a month ago. Prices for ¼-in. plates in large lots are $1.75c.; universals, 1.80c.; flange, 1.90c; marine, 2@2.10c.

Structural Material.—The demand for structural material this week is mainly for small lots, and for quick delivery, and as a natural consequence these small buyers are paying the outside figure.

Steel Rails.—Steel rail situation is satisfactory, although very little new business has come in outside of orders for girder rails that will probably foot up into several thousand tons. Quotations for girder rails, $33.50.

Pittsburg. June 16.

(From Our Special Correspondent.)

There is no change in the iron and steel market, and consumers are still delaying the placing of orders for late delivery. The reduction in prices of Southern iron has not had the effect of influencing buying. No sales of foundry have been made in this market, which may be due to a report that while the price of the No. 2 grade was fixed at $15, Birmingham, sales have been made for Western shipment at 50c. under that price. Further shading is expected. Northern foundry is extremely quiet, and but little business is being done in bessemer. All the sales during the week were for early shipment, and many consumers are asking the Valley furnaces to anticipate June and July contracts. It is known that prices of pig iron have been abnormal, and furnaces have been gradually dropping down. There is no necessity for a heavy cut, as the furnaces have all the business booked that can be taken care of for several months, and are not anxious to induce buying by making concessions in price. The steel mills in the Pittsburg District are buying from hand-to-mouth. The foundries seem to still have stocks on hand, as they are not in the market, and are not likely to come in until there is a lowering of prices. Foundry No. 2 for delivery this quarter has sold as high as bessemer, and the quotations to-day are practically the same as the prices named for bessemer iron. A large producer, outside of the Bessemer Furnace Association, sold 7,000 tons of bessemer iron last week at $19, Valley furnace, for delivery in the third quarter. This is the rate fixed by the association for the full second half, and is considered a cut from the established price. Other sales were for small lots, and the price was somewhat higher, as the orders called for early shipment. The purchase by the United States Steel Corporation for third quarter at $18.50, Valley furnace, did not have the effect on the market that was expected. The explanation that an agreement to furnish coke at $3 was equal to 50c. a ton, has not had any weight, as furnace coke can be bought at that price, and it is believed the rate will be shaded. Fancy coke prices have entirely disappeared, and $3 at the ovens likely will be the maximum price for the rest of the year. Some producers have expressed the opinion that as consumers are staying out of the market so long, there is likely to be a rush before many days, and that the demand will be so great that prices will be forced up again. The second of the three 450-ton blast furnaces of the Clairton Steel Company was blown in on Saturday night, and is now in successful operation. No. 1 furnace was put in blast a few weeks ago, and the third one will soon be ready. Stack No. 1 has broken all records by producing 575 tons in one day.

While there has been no official announcement, the report that the steel rail mills have opened their books for next year's business is credited. The price is the same as has prevailed since the spring of 1901, $28 a ton. This action, it is believed, will have the effect of strengthening the market in all lines of steel products. E. H. Harriman is said to have closed a contract for 100,000 tons of rails for delivery in 1904, to be used by the Union and Southern Pacific railroads. Announcement is made, but not officially, that a meeting of what is known as the rail pool will be held this week, at which formal action will be taken on next year's prices. A representative of one of the principal concerns that compose the pool said that, while he had no positive information, he would not be surprised if a meeting is held at an early date, and he seemed confident that there would be no change in price. The rail concerns that likely will be included in the pool this year for 1904 business are the Carnegie Steel Company, Cambria Steel Company, Pennsylvania Steel Company, Lackawanna Steel and Iron Company, Illinois Steel Company, Tennessee Coal, Iron and Railroad Company, and the Colorado Fuel and Iron Company. The Lackawanna Company has not made any nails for over a year, pending the removal from Scranton to the extensive new plant at Buffalo, N. Y. It is probable that it will be making rails before the end of the present year, and there will be a place for them, as it will be impossible for the rail mills of the country to make deliveries on all of the business on their books. The Tennessee Company will be a new concern in the pool.

The annual wage conference between representatives of the American Tin Plate Company and the Tin Workers International Protective Association, which began here last Friday, closed to-day. Some slight concessions were granted the workers, and the scale was signed. It is practically the same as the one now in force, and will go into effect on July 15. About 10,000 employees in the tinning houses are affected.

Pig Iron.—Not more than 10,000 tons of bessemer pig iron were sold during the week at prices ranging from $19@$19.50, Valley furnaces. There were no sales of any consequence of foundry or forge iron. Foundry No. 2 is quoted at $20@$20.50, and gray forge at $19.50@$19.75, Pittsburg.

Steel.—Bessemer steel billets continue scarce, and are quoted this week at $30@$20.50, Pittsburg. There is but little inquiry for open-hearth billets, and the price is about the same. The official price of plates has been re-affimed on a basis of 1.60c. for tank plates, car-load and larger lots, f.o.b. Pittsburg. Steel bars remain at 1.60c.

Sheets.—The market is strong, and there is considerable buying for early delivery. Many of the independent mills are short of steel, and are not turning out full production. Prices remain unchanged, black sheets, No. 28 gauge, being quoted at 2.75c., and galvanized at 3.85c.

Ferro-manganese.—Domestic 80 per cent is still out of the market, and the foreign product continues to be quoted at $50@$52.50.

St. Louis. June 16.

(From Our Special Correspondent.)

The iron and kindred trades of the Mississippi Valley and the St. Louis District have been tied up for the past week. The terminals of all lines have been under water for ten days, and every factory on the east side of the river has been seriously inconvenienced for the entire summer.

Pig Iron.—Buyers of the Valley are still indisposed to come into the market at the price of $15, Birmingham base. No sales have been made during the week. Deliveries on old contracts are being held up by freight conditions. Consumption of iron continues as heavy as ever, but interruptions have been so many during the year that foundries have still considerable stock on hand, and are evidently determined to wait for further concessions.

Finished Material.—The flood has played havoc with both local and outside trade among the jobbers. There is a brisk demand from Kansas City and Western points for beltings, and all factory and mill supplies. Local trade in odd sizes of structural material out of store continues strong.

New York. June 17.

Pig Iron.—The market continues quiet, but prices are a little weaker. We quote for early delivery, Northern iron at tidewater: No. 1X foundry, $19.75; No. 2X, $18.75; No. 2 plain, $18.25. For Southern iron on dock, New York: No. 1 foundry, $19.75; No. 2, $19; No. 3, $18.50.

Bar Iron and Steel.—We quote for large lots on dock: Refined bars, 1.80@1.95c.; soft steel bars, 1.78@1.90c.

Plates.—Demand has fallen off. Sheared plates are quoted: Tank, ¼-in. and heavier, at 1.80@2c.; flange, 2@2.05c.; marine, 2.10@2.20c.

Steel Rails.—The quotation remains $28 for standard sections, f.o.b. mills for 1903 delivery; light rails, $33@$36, according to weight. Relaying rails are $28@$30 for heavy sections and $33@$35 for light sections.

Structural Material.—The developments in local labor circles indicate that the contractors are in earnest, and that building is not likely to be resumed on a large scale till the walking delegate has learned a lesson. We quote for large lots at tidewater: Beams, angles, channels and tees, 1.75@2c.

CHEMICALS AND MINERALS.

(See also Prices-Current, page 956.)

New York, June 17.

Few lines of trade show any life whatsoever, and where anything is doing sellers are most obliging in shading quotations to suit consumers. In certain specialties, such as bromine, however, the tendency of sellers is to strengthen prices, as stocks are infinitesimal.

The Virginia-Carolina Chemical Company has listed $7,000,000 5 per cent collateral trust sinking fund bonds of 1912 on the New York Stock Exchange. The stock already listed amounts to $27,984,400 common shares, yielding 5 per cent dividends annually, and $12,000,000 in 8 per cent preferred stock. The total authorized capitalization, including the bonds mentioned, amounts to $57,000,000, representing property in the United States, Mexico and Germany. A report is current that the company is negotiating for two new potash mines in Hanover, Germany, and besides owning the Einigkeit plant, is behind the Helburg Mine, which controls the shares of the Wilhelmshall, at Aelsburg, much of the stock of the Berngardshall, as well as the Eime factory. It is also believed that the Virginia-Carolina Chemical Company has in view the Thuringe plant, which is independent of any syndicate, although it has an elastic contract to sell its camallite production to the potash trust.

Abroad the trade in rare elements has heard of a proposed German "corner" in thorium, which is employed in the manufacture of incandescent gas mantles. The price there has nearly doubled in a year, owing to the fact that a concession to work extensive monazite sand deposits in Brazil, from which thoria is obtained, is held by a German firm. The American demand for thorium nitrate fluctuates between 10,500 lbs. and 11,000 lbs. annually. The import price, including the 25 per cent ad val. duty, in recent years has averaged around $3.25 per lb., but sellers at New York now quote $4.50, delivered.

The Solvay Company, at Bernburg, Germany, reports net profits for 1902 at 6,227,649 marks ($1,482,170), which is equivalent to nearly 62 per cent on the capital stock of 10,000,000 m. ($2,380,000). There are also 700,000 m. ($166,600) bonds. The reserve fund has been increased 3,301,604 m. ($785,782) to 32,116,120 m. ($7,663,635).

Bromine.—The decrease of nearly 7 per cent in the production of bromine in the United States last year, owing partly to the dissolution of the trust and to low prices, is beginning to tell on the market now that consumption has increased. Last year 13 works, situated in Michigan, West Virginia, Ohio and Pennsylvania produced 513,890 lbs. of bromine, which includes the quantity contained in the potassium bromide made. Stocks in makers' hands are small, hardly enough to satisfy demand on regular contracts, which were taken some time ago at very low prices. To-day prompt deliveries command 48c. per lb. for bromine, and 38c. for potassium bromide. We note an exportation recently of 1,000 lbs. potassium bromide to Germany, at an average value of 28c. per lb., which is 10c. less than is now asked for prompt domestic delivery on other than regular contract orders.

Cyanide of Potassium.—Imports are principally of German cyanide, of which a lot of 920 cases (207,000 lbs.) was recently received at New York. Sellers here quote 20c. per lb., but a shade less would likely be the basis for an important order. Exporters are doing a small business, recently sending 10 cases to Halifax, Nova Scotia, at an average invoice value of 18.5c. per lb., and 5 cases to Colon, Colombia, at 19.1c.

Bleaching Powder.—Why elaborate on a situation that is provoking to manufacturers as well as to dealers by repeating what has already been said about the demoralization in the trade? Words will not repair the injury done old process bleach makers by their competitors, the electrolytic works; each must do his "turn" while the consumer is an interested spectator. It is whispered that calculations are being made on next year's prices. If the present quotation on the Liverpool market is to be taken as the basis, 1904 offers little encouragement to makers. At £3 15s. ($15.78) per long ton, f.o.b. Liverpool, manufacturers realize 5s. ($1.20) less at works, than was obtained when relations with Continental makers were discontinued last year. How near the cost of manufacture current quotations are can be conjectured, when it is learned that last year's prices which were somewhat higher, pared down profits considerably. In New York to-day prime foreign bleaching powder can be bought at $1@$1.12½ per 100 lbs., while domestic is quoted 75c.@$1, f.o.b. works. Even at these prices buyers are scarce.

Copper Sulphate.—Occasionally an export order is received, but the amount is comparatively smaller than has heretofore been the case. Prices are weakening, as henceforth trading will be limited, for the season is practically over. Those who wish can buy at $4.37½@$4.62½ per 100 lbs., f.o.b. New York. Importers have withdrawn, for the time at least.

Exports of copper sulphate from New York in May amounted to 3,313,862 lbs., making a total since January of 14,416,816 lbs., which is 20,825,194 lbs. less than was reported in the corresponding period last year. Of the shipments this year, Italy received 6,956,845 lbs.; Austria, 6,772,335 lbs., and Argentina, 307,831 lbs., the remainder being destined to Belgium, France, Russia, Portugal, West Indies, Mexico, Chile and Colombia.

Acids.—Small exports of sulphuric acid are noted to Mexico and South America, and of muriatic to Mexico and the West Indies; but the trade does not indicate any rapid increase. Domestic consumption is still interrupted by the labor troubles, but, it is believed, the situation will soon change for the better. Prices are nominally unchanged, as deliveries are being made on contracts taken some time ago. We quote as below, per 100 lbs., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°....	$1.50	Oxalic Com'l ..	$5.25@$5.50
Muriatic, 20°....	1.60	Sulphuric, 50°,	
Muriatic, 22°....	1.75	bulk, ton ...	13.50@14.50
Nitric, 36°.....	4.37½	Sulphuric, 60° .	1.05
Nitric, 38°.....	4.75	Sulphuric, 60°,	
Nitric, 40°.....	5.00	bulk, ton ...	18.00@20.00
Nitric, 42°.....	5.37½	Sulphuric, 66°,	1.20
		bulk, ton ...	21.00@23.00

Brimstone.—Arrivals are more frequent. The cargoes received, however, are not for new orders, but deliveries on contracts taken some time ago. New business is scarce. Spot best unmixed second are offered at $22.25 per ton, while shipments will be booked at $22. Best thirds are nominally $1 less than seconds.

Sicilian Brimstone Market.—Messrs. Emil Fog & Sons, of Messina, write us under date of May 31 that

the brimstone market showed little animation during the month. The demand usually setting in at this time from Northern Italy is wanting, owing to the cold and unseasonable weather in April. The refineries at Catania, which are usually active until July, are now beginning to cease work, and prices within a few days have dropped 2s. to 3s. The great uncertainty regarding the future weighs heavily on the situation. Only 2½ years remain for the completion of the Anglo-Sicilian contract. Large companies allow drawbacks to important customers, but the Anglo-Sicilian Company maintains its price. Freights have not advanced, and steamers are still offering at low rates. To New York, 7s.; Baltimore, 7@8s.; Boston, 7s. 6d.; Philadelphia, 8s.; Baltic, 9s.@9s. 6d.; San Francisco, via Antwerp, by sailer, 31s. We quote sulphur per ton, f.o.b., as follows: Best unmixed seconds in bulk, 82s.; best thirds, 79s.; current thirds, 78s.; refined block, 85s. 9d. in bulk, and 88s. 9d. in bags; refined roll, 92s. 9d. in bags and 97s. 3d. in casks; refined sticks, 101s. 9d.@103s. 9d.; sublimed flowers, pure in bags, 107s.; current, 97s. 6d.; and commercial, 92s. 3d.; best seconds, ground sulphur, 87s. 6d.

Pyrites.—Contract deliveries are seasonably good, but imports show a slight falling off. This, however, does not indicate that this year's imports will be less than last year; if anything, they will be larger.

We quote: Domestic pyrites, $5 per ton for lump ore, f.o.b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Producers are holding for higher prices, and as ocean freight rates have advanced, importers are in a position to demand more money. Recent arrivals are selling at $2.05 per 100 lbs., while July, August and September cargoes are quoted $2.02½@$2.05, and October forward, $1.95@$2.

Sulphate of Ammonia.—Gas liquor is firmer. For immediate delivery $3.20 per 100 lbs. is quoted, and for later shipment $3.12½@$3.15.

Phosphates.—Sales of high-grade Florida rock for next year and early 1905 exportation are reported at 7¼@7¾d. per unit ($11.31@$12.09 per ton), which is more than has been paid of late. Previously 7⅛d. was considered a fair price, but the advance bears out the statement that miners are determined to rehabilitate the market. Exporters expect firmer ocean freight rates, and already 1904 charters are being booked from Tampa to the Baltic on the basis of 15s. 9d. ($3.78). There is also a tendency to book orders for Algerian rock at higher prices, and recent contracts for 1904 and 1905 delivery are reported at 5½@6d. per unit ($6.69@$7.80 per ton), delivered in Europe.

From all indications the consumption of phosphoric acid will continue to grow, especially in Germany. The unfortunate reaction is that prices for superphosphates, owing to the heavy production and keen competition, are demoralized, and it is said, yield little profit to manufacturers.

The shipments of high-grade rock from Fernandina, Fla., in May, amounted to 11,360 tons, making a total since January of 53,350 tons, which is 22,350 tons, or 29.5 per cent less than last year.

Phosphates	Per ton F. o. b.	United Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (77@80%)	$7.00@$7.50	7¼@7¾d.	$11.31@12.09
*Fla. land peb. (68@73%)	3.50@ 3.75	5½@5¾d.	7.70@ 8.05
†Tenn., (78@82%) export	4.00@ 4.25	6½@7d.	10.40@11.20
†Tenn., 78% domestic	3.75@ 4.00	.....	.....
†Tenn., 75% domestic	3.50	.....	.....
†Tenn., 73@74% domestic	2.95@ 3.20	.....	.....
†Tenn., 70@72% domestic	2.70@ 2.95	.....	.....
‡So. Car. land rock	....@ 3.25	.....	.....
‡S. Car. riv. r'k (55@60%)	2.75@ 3.00	5¼@5⅝d.	5.95@ 6.53
Algerian (63@70%)	.....	5½@6¼d.	7.37@ 8.38
Algerian (58@63%)	.....	5¼@6d.	6.30@ 7.20
Gafsa (Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl (80@85%)	.....	7¼@7¾d.	12.04@12.87

* Fernandina, Tampa, Brunswick, Savannah or Port Inglis. † Mt. Pleasant. ‡ On vessels, Ashley River.

METAL MARKET.

New York, June 18.

Gold and Silver Exports and Imports.

At all United States Ports in May and Year.

Metal	May. 1902.	May. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports	$1,968,407	$14,488,288	$19,884,712	$18,819,895
Imports	1,497,053	1,462,845	9,100,887	10,600,646
Excess	E. $471,354	E. $13,025,423	E. $10,783,825	E. $8,219,249
Silver:				
Exports	$3,785,305	$2,148,412	$19,277,968	$15,875,563
Imports	1 946,811	1,613.183	10,417,885	8,289,963
Excess	E $1,838,494	E $535,229	E. $8,860,083	E. $7,585,570

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending June 17, and for years from January 1:

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week	$1,367,676	$6,330	$181,274	$45,309	E. $1,497,251
1903	14,978,434	2,969,404	5,291,37[illegible]	1,934,329	E. 19,266,080
1902	16,495,762	1,209,591	13,533,250	644,464	E. 28,175,157
1901	24,935,988	1,246,706	15,988,423	1,948,098	E. 37,761,707

The gold exported this week went chiefly to South America; the silver to London and Paris. The gold imports were chiefly from Cartagena and St. Kitts; the silver from Southampton. To the years total for gold exports and silver exports is added shipments too late for preceeding week.

Financial Notes of the Week.

While it can hardly be said that general business is seriously disturbed, the depression in the stock markets is having undoubtedly some effect. Business is so largely governed by sentiment, that it is difficult to separate the purely speculative interest from others which should not be affected. For this reason there has been some hesitation, and matters can hardly be considered in as good shape as they were a week ago; still there is no serious depression, and manufacturing is still as active as the numerous trade disputes will permit.

Exchange continues very high, but comparatively little gold has gone out this week. Some shipments to South America on London account have been the principal items.

Exports of merchandise from the United States in May are valued by the Bureau of Statistics of the Treasury Department at $100,508,051; being a decrease of $9,319,164 from those of April, and a decrease of $1,813,480, as compared with May, 1902. For the eleven months of the fiscal year from July 1 to May 31 the statement is as follows:

	1902	1903.
Exports	$1,292,478,918	$1,324,493,293
Imports	830,205,894	943,597,194
Excess, exports	$462,273,024	$380,896,099
Add excess of exports, silver		20,580,561
Total		$401,476,660
Deduct excess of imports, gold		7,631,467
Apparent balance of exports		$393,845,193

The gold and silver movement will be found in the usual place, at the head of this column.

The statement of the New York banks, including the 56 banks represented in the Clearing House, for the week ending June 13, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts	$900,943,900	$881,070,400	$903,362,000
Deposits	984,194,300	942,868,600	886,829,700
Circulation	30,904,400	31,410,800	44,006,100
Specie	177,153,400	172,373,700	156,145,400
Legal tenders	77,677,300	76,645,800	75,039,200
Total reserve	$254,830,700	$249,019,500	$231,184,600
Legal requirements	246,048,575	235,717,150	221,707,425
Balance surplus	$8,782,125	$13,302,350	$9,477,175

Changes for the week, this year, were increases of $2,337,100 in legal tenders, and $4,701,525 in surplus reserve; decreases of $11,776,100 in loans and discounts, $11,795,300 in deposits, $96,100 in circulation, and $584,400 in specie.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd.	$172,373,700	.....	$156,145,400	.....
England	186,559,100	.....	182,039,175	.....
France	513,215,190	$224,124,895	499,496,560	$224,507,200
Germany	197,185,000	72,935,000	172,025,000	60,445,000
Spain	70,695,000	92,625,000	72,680,000	102,420,000
Neth'l'ds	23,414,500	33,918,500	19,700,500	32,944,500
Belgium	16,600,000	8,300,000	15,680,000	7,840,000
Italy	80,985,000	10,724,000	89,860,000	11,280,000
Russia	372,305,000	45,480,000	388,580,000	44,015,000

The returns of the Associated Banks of New York are of date June 13, and the others June 11, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market has been fairly steady, with no new feature. India has been a moderate buyer. Spot supplies in London are rather limited. Absorption by United States Treasury through purchases for Philippine coinage continues to a moderate extent.

The United States Assay Office in New York reports receipts of 46,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to June 4, are reported by Messrs. Pixley & Abell's circular, as follows:

	1902	1903.	Changes.
India	£3,317,975	£3,067,625	D. £250,350
China	339,125	183,231	D. 155,894
The Straits	79,976	206,079	I. 126,103
Total	£3,737,076	£3,456,935	D. £280,141

Receipts for the week, this year, were £75,000 in bar silver from New York, £16,000 from the River Platte, and £5,000 from Australia; total, £96,000. Shipments were £34,400 in bar silver to India, £20,000 to Singapore, and £15,075 to Hong Kong; total, £69,475.

Indian exchange has been rather weak, though the Council bills offered in London brought an average of 15.97d. per rupee. The demand for bills was smaller than for some weeks past. The buying of silver for India has been light.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.41⅛	$0.43
Peruvian soles and Chilean pesos	.39	.42
Victoria sovereigns	4.85	
Twenty francs	3.86	
Twenty marks	4.74	
Spanish 25 pesetas	4.78	

OTHER METALS.

Daily Prices of Metals in New York.

June.	Sterling Exchange	Silver N. Y. Cts.	Silver London, Pence.	Copper Lake, Cts. per lb	Copper Electrolytic, Cts. per lb.	Copper London, £ per ton	Tin, Cts per lb	Lead Cts. per lb.	Spelter N. Y. Cts. per lb.	Spelter S. L., Cts. per lb.
11	4.87⅝	52½	24⅞	14 @14½	14 @14⅛	56¾	28¼	4.30 @4.35	5.70 @5.80	5.50 @5.60
12	4.87½	53¼	24½	14 @14½	14 @14⅛	58	28½	4.30 @4.35	5.70 @5.80	5.50 @5.60
13	4.87¼	52¾	24⅞	14 @14½	14 @14⅛	....	28½	4.30 @4.35	5.70 @5.80	5.50 @5.60
15	4.87¼	52½	24⅞	14 @14½	14 @14⅛	58	28¾	4.30 @4.35	5.70 @5.80	5.50 @5.60
16	4.87½	53	24⅞	14 @14½	14 @14⅛	57⅝	28¾	4.30 @4.35	5.70 @5.80	5.50 @5.60
17	4.87½	52⅜	24⅜	14 @14½	14 @14⅛	56¾	28¾ @28⅞	4.05 @4.10	5.70 @5.80	5.50 @5.60

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures

Copper.—Again we have to report a lifeless market. The continued weak tendency of the stock exchange has caused buyers to remain out of the market. It looks, however, as if this state of affairs could not continue much longer and more active business is expected shortly in well informed quarters, as consumers are very poorly supplied.

There is a somewhat better inquiry from Europe. Quotations are nominal at 14@14½c. for lake; 14@14⅛c. for electrolytic in cakes, wirebars or ingots; 13¾@13⅞c. for cathodes and 13⅝@13¾c. for casting copper.

The market for standard copper in London, which last week closed at £58, opened on Monday at the same price, and the closing quotations on Wednesday are cabled as £56 15s.@£56 17s. 6d. for spot, and £56 5s.@£56 7s. 6d. for three months prompt. For refined and manufactured sorts we quote English tough, £61 10s.@£61 15s.; best selected, £62 10s.@£62 15s.; strong sheets, £70@£70 10s.; India sheets, £67@£68; yellow metal, 6¼@6⅜d.

Statistics for the first half of June show a decrease in the visible supplies of 200 tons.

Exports and imports of copper at New York, Philadelphia and Baltimore in the week ending June 16, and for the year to date, are reported by our special correspondents as follows, in long tons:

Exports:	Week.	Year.
Austria	200	2,847
Belgium	....	860
France	....	10,217
Germany	814	11,918
Holland	645	18,037
Italy	....	1,411
United Kingdom	175	7,457
Other countries	74	2,735
Total copper	1,908	56,391
Matte	....	211
Imports:		
Copper	638	11,940
Matte	305	984

The movement shows a falling off this week. Of the imports 101 tons copper came from Germany, while the matte was from Great Britain.

Tin has developed considerable strength and a fair amount of business has been transacted. Spot metal is rather scarce and commands a premium. The closing quotations are given as 28¾@28⅞c. for spot and 28@28¼c. for futures.

The foreign market, which last week closed at £127 5s., opened on Monday at £130, and the closing quotations on Wednesday are cabled as $129@£129 2s. 6d. for spot and £127@£127 2s. 6d. for three months prompt.

The production of Banka and Billiton tin, in the Dutch East Indies, is officially reported as below, for the fiscal year ending April 30, in long tons, of 2,240 lbs.:

	1901-2.	1902-3.	Changes.	%
Banka	10,067	10,180	I. 113	1.1
Billiton	4,661	4,484	D. 177	3.8
Totals	14,728	14,664	D. 64	0.4

The total quantity disposed of at the official auction sales last year was 14,460 tons.

Lead.—The market remained unchanged up to Tuesday, when the trade was startled by another reduction in the prices of the American Smelting and Refining Company, of $5 per ton, the same to go into effect June 17. It is expected that at the lower values established, inquiry will be stimulated to a larger extent. The closing quotations are 3.29½@4c., St. Louis, and 4.05@4.10c., New York.

The foreign market is weak, Spanish lead being quoted £11 5s., and English lead, £11 7s. 6d.

Exports of lead from New York in May were 24,100 lbs.

St. Louis Lead Market.—Our special correspondent reports business very slow, on account of the floods and breaks in the railroads. Receipts, as reported to the Merchants' Exchange, were 26,115 pigs; shipments were 4,010 pigs, against 32,280 in the previous week.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of May 30, that the price of silver during the week has been 13.50 reales per ounce. Exchange has gone up 4 centimes, making it 34.29 pesetas to £1. The local quotation for pig lead on wharf has been 84 reales per quintal, which, on above exchange, is equal to £10 14s. 6d. per ton of 2,240 lbs., f.o.b. Cartagena.

Exports of pig lead have been 1,431,846 kgs. to London; 344,015 kgs. to Marseilles; a total of 1,775,861 kgs.

Spelter remains very firm indeed, spot being rather scarce and commanding a premium. The situation in the West with regard to the floods is beginning to improve, and shipments will shortly again be resumed. The quotations are 5.50@5.60c., St. Louis, and 5.70@5.80c., New York.

The foreign market is steady, good ordinaries being quoted £20 15s., and specials £21.

St. Louis Spelter Market.—Our special correspondent reports business almost at a standstill. Receipts, as reported to the Merchants' Exchange, were 18,485 slabs; shipments were 3,520 slabs, against 24,700 in the previous week.

Silesian Spelter Market.—Herr Paul Speier reports from Breslau, under date of June 4, that the market is weaker, feeling the effect of the lower range of prices in London. Quotations are 20.50@20.75 marks per 50 kgs., f.o.b. cars, Breslau. This is equal to 4.43c. per lb.

Zinc dust has been quiet; only one plant is now shipping any quantity. Prices are lower, in accordance with the fall in spelter.

Imports into Germany for the four months ending April 30 included 6,244 metric tons spelter; 46 tons sheets; 592 tons scrap; 1,370 tons zinc white; 18,370 tons zinc ore. Exports were 19,559 tons spelter; 3,329 tons zinc sheets; 1,223 tons scrap; 5,205 tons zinc white; 14,912 tons zinc ore. Exports of lithophone were 2,719 tons.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of May 30, that the condition appertaining to the blende and calamine business just now are not at all encouraging and prices continue to fall steadily, and many of the large mines contemplate shutting down their output pending a recovery in the price of spelter. Shipments for the week were 2,759 tons blende and 341 tons calamine to Antwerp.

Antimony is dull and depressed. We quote: Cookson's, 7½@7¾c.; Hallett's, 6⅝@6¾c.; Hungarian, French, Japanese, Italian and United States Star, 6⅜@6½c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Prices of nickel anodes have been agreed upon as follows: 80 to 82 per cent nickel, 45@50c. per lb.; 82 to 84 per cent, 47@49c.; 85 to 87 per cent, 49@54c.; 90 to 92 per cent, 52 @57c.; 95 to 97 per cent nickel, 54@59c. The lowest price, in each case, is for lots of 500 lbs. or over; the highest for lots of 100 lbs. or less.

Exports of nickel from New York in May were 33,600 lbs., having an average invoice value of a fraction over 32c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, with a slightly higher figure quoted for small orders. The San Francisco quotations are still $44.50@$46 per flask for domestic orders, and $42@$43 for export. The London price is £8 12s. per flask, with the same quotation asked by second hands.

Minor Metals and Alloys.—Wholesale prices, f.o.b. works, are as follows:

Aluminum.	Per lb.
No. 1 99% ingots	33@37c.
No. 2 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N.Y.)	80c.
Copper, red oxide	50c.
Ferro-Molyb'um (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.

	Per lb.
Ferro-Tungsten (37%)	28c.
Magnesium	$2.75
Manganese, pure (N. Y.)	60c.
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus foreign	45c.
Phosphorus American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variation in prices depends on size of orders, deliveries, etc.

Missouri Zinc Ore Market. June 13.

(From Our Special Correspondent.)

The sale of a 600-ton lot of ore at Wentworth during the week leaves practically no unsold ore in the district, except a bin of 200 tons at Reeds. The seller was the Empire Zinc Company, the name by which the New Jersey Zinc Company is known in Missouri. The Matthiessen & Hegeler Zinc Company was the purchaser. The ore is said to have been sold on an assay basis, and rumor has it that the basis was $37 per ton of 60 per cent zinc. It cannot be recalled when the output of the Joplin District was ever purchased more closely, and it is particularly noteworthy that, although the ore reserve has been so greatly reduced, the price continues to rest at $40 per ton as the highest value; but where the top price has not been advanced ores ordinarily classed one, two and three points below top grade are commanding as high prices as the very choicest lots, This is why it becomes necessary in giving an idea of the assay basis to explain that it varies from $35 to $37.50 per ton of 60 per cent zinc. This is a variation in addition to the drop on the sliding scale plan by which ore under 60 per cent, because usually in less demand, is purchased on a lower basis than the better ore. The highest price of the past week was $40, and this was paid for ore assaying from 62 to 64 per cent zinc. Additional demand for lead caused several bins of that mineral to be sold a half dollar per ton higher, but the general price was $54 per ton. Lead ore is purchased with the assumption that it will produce 70 per cent in metal, and, from this as a basis point, prices fluctuate. In former years prices followed very closely the St. Louis pig lead market, but less so the past three years. A year ago zinc brought $34 and lead $45.50 per ton.

On March 21 it was said in these market reports that "the district is to-day outputting at its limit, and this limit will be increased very slowly for a couple of months." Two months have come and gone and the district is outputting no more to-day than it was at that time. And several more weeks are sure to pass before there is any material change in this situation.

Following are the sales of zinc and lead ores from the various camps for the week:

	Zinc, lb.	Lead, lb.	Total Value.
Joplin	2,796,880	437,600	$62,159
Carterville-Webb City	1,928,920	420,360	45,006
Galena-Empire	887,870	88,470	17,926
Duenweg	736,920	244,880	19,877
Aurora	456,110	7,100	7,564
Zincite	381,520	18,030	7,354
Oronogo	365,200	1,260	6,718
Alba-Neck	269,490	.....	4,851
Prosperity	163,410	15,940	3,535
Granby	237,000	28,000	3,455
Carl Junction	175,430	.....	3,333
Cave Springs	127,670	12,410	2,631
Spurgeon-Spring City	128,110	14,440	2,788
Central City	71,370	.....	1,320
Badger	76,370	.....	1,320
Mitchell	70,470	.....	1,268
Diamond	64,180	.....	1,125
Carthage	44,760	.....	840
The week	8,981,820	1,300,220	$193,291
24 weeks	225,143,080	26,597,540	$4,548,915

Zinc value the week, $158,260; 24 weeks, $3,823,150. Lead value the week, $35,031; 24 weeks, $725,765.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.805	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.849	4.23
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	....	29.36	....	4.075	....	4.90
July	....	28.38	....	4.075	....	5.27
August	....	28.23	....	4.075	....	5.44
September	....	26.60	....	4.075	....	5.49
October	....	26.07	....	4.075	....	5.23
November	....	25.68	....	4.075	....	5.18
December	....	25.68	....	4.075	....	4.78
Year	....	26.79	....	4.069	....	4.84

Average Prices of Copper.

Month.	New York Electrolytic. 1903.	New York Electrolytic. 1902.	Lake. 1903.	Lake. 1902.	London Standard. 1903.	London Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	53.16
March	14.416	11.882	14.572	12.188	63.85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.06
June	.....	12.110	.....	12.360	....	53.98
July	.....	11.771	.....	11.923	....	53.89
August	.....	11.404	.....	11.649	....	51.96
September	.....	11.480	.....	11.760	....	52.68
October	.....	11.449	.....	11.722	....	52.18
November	.....	11.288	.....	11.533	....	51.06
December	.....	11.430	.....	11.599	....	50.96
Year	.....	11.626	.....	11.887	....	53.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London. Pence.	1903. N. Y. Cents.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.
January	21.98	47.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.63
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	....	....	24.17	52.36	27.42	59.57
July	....	....	24.38	52.88	26.96	58.46
August	....	....	24.23	52.52	26.94	58.37
September	....	....	23.88	51.52	26.95	58.26
October	....	....	23.40	50.57	26.62	57.59
November	....	....	22.70	49.07	26.12	56.64
December	....	....	22.21	48.03	25.46	55.10
Year	....	....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of Company.	Date.	Per Share.	Total.	Total to Date.
Bartolome de Medina, Mex.	June 30	.65	1,290	71,808
†Central Coal & Coke com.	July 15	1.50	76,875	474,375
†Central Coal & Coke, pf.	July 15	1.25	23,437	773,435
*Cinco Senores, Mex.	June 30	4.30	8,600	703,735
†Crucible Steel, pf.	June 29	1.75	437,500	4,812,500
*Homestake, S. D.	June 25	.25	54,600	12,039,750
*Home Oil, Cal.	June 20	.07½	7,500	495,000
§Maryland Coal, pfd.	July 1	2.50	47,125	951,885
Maryland Coal, pf., extra	July 1	1.00	18,850	.....
†Mont. Ore Purch.	June 27	2.00	162,000	2,970,000
*Pacific Coast Borax	June 30	1.00	19,000	1,331,500
†Republic Iron & St., pf.	July 1	1.75	356,246	5,693,032
St. John del Rey, Brazil.	June 26	.16	87,402	14,093,397
†Va.-Car. Chem., pf.	July 15	2.00	240,000	6,780,000

* Monthly. † Quarterly. § Semi-annual.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Ajax	Utah	4	June 11	June 29	.05
Alpha Con.	Nev.	27	June 30	July 21	.05
Ben Butler	Utah	10	June 15	July 2	.00¼
California	Utah	..	July 9	July 25	.001½
Caledonia	Nev.	54	July 8	July 24	.15
Carisa	Utah	..	June 2	June 30	.03
Challenge Con.	Nev.	36	June 23	July 14	.05
Eureka Con. Drift	Cal.	37	June 20	July 11	.00½
Esperanza	Cal.	..	July 13	.....	.01
Free Silver	Utah	..	July 10	Aug. 10	.00¼
Golconda	Utah	5	June 27	July 17	.04¼
Jenny Lind	Cal.	17	June 20	July 6	.01½
Justice	Nev.	78	June 8	June 27	.10
Kern River Oil	Cal.	..	June 30	.....	.56
Mexican	Nev.	74	June 10	July 1	.10
Mountain Lake	Utah	..	June 8	July 6	.005
New York Bonanza	Utah	1	July 1	July 21	.03
Nixon placer	Cal.	..	June 30	.....	.05
Occidental	Nev.	42	June 18	July 9	.10
Old Colony & Eureka	Utah	5	June 11	June 29	.01
Reamer Con.	Cal.	..	July 13	.....	.10
Scorpion	Nev.	..	June 15	July 17	.05
Sierra	Cal.	..	June 22	.....	.02
Silver Shield	Utah	5	June 19	July 7	.04
South Eureka	Cal.	..	June 25	.....	.03

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	June 10. H.	June 10. L.	June 11. H.	June 11. L.	June 12. H.	June 12. L.	June 13. H.	June 13. L.	June 15. H.	June 15. L.	June 16. H.	June 16. L.	Sales
*Alta, Nev	1	.04												500
Amalgamated c., Mont	100	53½	51	55¾	52⅜	57	55½	57½	56⅜	56⅝	53¾	54⅝	52¾	261085
†Anaconda c. Mont.	25	85	83	88¾	86	90	90	90⅝	90	88	87⅛	87	86½	2,900
Anaconda Gold, Colo.	5			.08										1,000
Belcher, Nev.	3													
Best & Belcher, Nev.	3	2 15				2 00				1 85	1 80	2 25		500
Brunswick, Cal.	1			.08	.08	04½		.08	.08	7⅛	7⅛			500
Chollar, Nev.	3									.20				400
C. K. & N., Colo.	1													
Comstock T., s., Nev.	3													
Comst T. Bonds	100													
*Confidence, Nev.	1	1 25												100
Con. Cal. & Va., g. s. Nev	2½	1 55				1 85						1 70	1 65	700
Cons. Imperial, Colo.														
*Creede & C. C., Colo.	1	01⅛												2,000
Cripple Creek c., Colo.	1													
Elkton g., Colo.	1	45	44			44				44		44		1,100
Gold Dollar, Colo.	1													
Golden Fleece, Colo.	1	15		15								15		600
*Gould & Curry, Nev.	3	43	43											400
Greene Con., c., Mex.	10	19⅜	19	20¼	19¼	22¾	21¾	22¾	22	21⅞	20⅜	21⅛	20½	12,465
Hale & Norcross	3									.68				20
Homestake, S. Dak.	100													
Isabella, g., Colo.	1					.17				17½	.17	.17		2,000
Justice, Nev.	1									.13				500
Leadville, Colo.	10					.03						.03		800
*Little Chief, Colo.	1											.08		400
Mexican, Nev.	3					1.25						1.25		300
Mollie Gibson, Colo.	5													
Moon-Anchor, Colo.	5													
Occidental, Nev.	1			.28										300
Ophir, s., Nev.	1			1.90										200
Overman, Nev.	1													
Portland, Colo.	1			1.35										200
Potosi, Nev.	3			.34						.19				300
Sierra Nevada, Nev	3													
Silver Hill, Nev	1													
Small Hopes, Colo.	20			.33										100
Syndicate, Cal.	1													
Tenn. c., Tenn	25	28⅛	28⅛	29	28¾	29¾	29¾	30	30	29¾	29⅝	29⅛	29¼	2,360
Union Con., Nev.	2½				.90									100
Union Cop., N. C.	10	1⅜	1⅜	1⅜	1⅜	1¾	1⅝	1¾	1⅝	1⅝	1⅝	1⅜	1⅝	2,500
Vindicator, Colo.	1													
White Knob, g. s., Ida	100			13¾	13¼	14½	14	14¾	14¾	15½	14¾	14¼	14	1,685
*Work, Colo	1					.06								500

Total sales 296,755 shares.

BOSTON, MASS.*

Name of Company.	par val	Shares listed.	June 10. H.	June 10. L.	June 11. H.	June 11. L.	June 12. H.	June 12. L.	June 13. H.	June 13. L.	June 15. H.	June 15. L.	June 16. H.	June 16. L.	Sales
Adventure Con., c.	$25	100,000	5⅛	5	5⅛	5⅛	5⅛	5¼	5⅛		5⅛	5⅛	5⅜		2,538
Allouez	25	99,511	6		6⅛	6	6⅛	6⅛	⅛	6⅛	6⅛	6¼	6¼	⅛	4,125
Amalgamated, c.	100	1,538,879	53¼	51¼	55⅝	53	57	55⅜	57⅝	56⅛	57	53⅞	54⅜	52⅝	42,247
Am. Gold Dredging	5	80,000													
Am. Z. L. & Sm.	25	60,000													
Anaconda	25	1,200,000	21⅜								21⅛				80
Arcadian, c.	25	150,000	2⅛	2⅛	2⅜	2¼	2⅛		2⅜						685
Arnold	25	60,000	.25								.25				60
Atlantic, c.	25	100,000	9¼	9	9⅛	10¼			10¾	10⅛	10⅛		10¼	9⅝	767
Bingham Con. g. s.	50	150,000	26	25¼	26⅜	25¼	27⅝	27	28¾	27½	28	27½	28	27¼	4,905
Bonanza	10	300,000													
Cal. & Hecla, c.	25	100,000	475	470	474	460	470	460	475	470	470		470		140
Centennial, c.	25	90,000	18¾	17⅜	20	19	21	19¾	22	20⅝	20¼	19½	20	18½	7,982
Central Oil	25	60,000			7				7⅛	6⅞			7¼	7	1,200
Con. Mercur, g.	5	1,000,000			1¼				1⅜		⅛	1¼			1,500
Copper Range Con.	100	285,000	51⅝	50⅜	54⅜	51½	54¾	53¼	55⅝	54⅜	54⅛	51¼	53¼	51¼	29,669
Daly-West., g. s.	20	180,000	43	42	42	42	43	41½	44	43½	44	42¾	43	41⅜	1,433
Dominion Coal	100	150,000	76¼	75¼	79⅜	76	85½	79⅜	92	87⅜	90	88	89	85	8,336
Dominion Coal, pf.	100	30,300													
Dominion I & S.	100	100,000	12¾	11⅜	14	13⅜	14	13¼	14	13⅛	13⅜	12⅜	13	12½	6,980
Elm River	12	100,000	2¼		3	2⅞	3¼	3	3⅜	3¼	3½	3½	3¼	3⅛	3,830
Franklin, c.	25	100,000	8¼	8	9	8⅛	9⅜	9¼	9¾		9½		9⅜	9	795
Granby	10	1,338,303	4⅞	4⅜	4⅝	4⅛					4⅞	4⅝			5,575
Guanajuato, Con.	5	385,000	1½	1⅜	1⅜	1¼	1½				1⅜	1⅜	2	1⅜	2,565
Isle Royale Con., c.	25	385,000	6½		7		7⅛		7⅜		8	6¾	7⅛	7	965
Mass Con., c.	25	100,000	7	6¾	6¾		7	6⅝			7⅛				455
Mayflower, c.	25	100,000	1⅛									1¼			100
†Michigan, c.	25	100,000	8		7⅜	7¼	8¼		8¼		8				804
Mohawk, c.	25	100,000	43	42½	44½	42¾	45	44¼	46¾	45	45½	43¾	44	43½	2,948
Mont. Coal & Coke	25	200,000													
Mont'l & Boston, c.	5	570,000			1⅛		1⅛	1⅛			1⅛		1¼		1,000
New Idria	5	100,000											9		50
Nova Scotia St. & C.	100						85				85¾				345
Nova Scotia St. & C. pf	100														
Old Colony, c.	25	100,000	75		75		75		75		1.00	75	75	50	1,649
Old Dominion, c.	25	150,000	13½	12¾	14	12¾	15	13¾	15¼	15	15	13¾	13¾	13¾	3,835
Osceola, c.	25	98,150	53	52¼	56	54¾	58¼	57	58¾	57	57	54	55	53¾	1,885
Parrot, s. c.	10	229,850	22	21¼	22¼	22	23	22¼	23¼	23	23	22	2		570
Phoenix Con., c.	25	100,000	4⅜	4							4¼				285
Quincy, c.	25	100,000	99		100		100				100				295
Rhode Island, c.	25	100,000	2¼	2	2	1⅝	2⅜	2					2		1,225
Santa Fe, g. c.	10	250,000	1½	1⅜	1½	1⅜	1½	1½	1⅜		1½		1½		1,065
Shannon, c.	10	188,153	11⅜	11	11⅜	10¾	12⅛	11⅝	13	12⅜	12¾	11½	11⅜	11¼	3,045
Tamarack, c.	25	60,000	110		110		120	112	120	118	120	118			347
Trimountain	25	100,000	83¼	82	88⅜	83	89	87	90	80	80	80	90	87	1,650
Trinity, c.	25	160,000	5¾	5	5⅜	5¼	6¼	5¾	7	6¼	6½	6	6		5,184
United Copper	100	450,000					19	18							225
United States, g.	25	419,000	19¾	19⅝	20½	19⅝	21⅝	20⅛	22¾	21½	22⅛	20¾	21	20⅛	9,362
U. S. Coal & Oil	25	240,000	11	10¾	12	11⅜	12¼	12	12¾	12⅛	12¼	11¾	11⅞	11½	2,942
Utah Con., g.	5	300,000	29	28¼	29¾	28½	30¼	30	30⅞	30¼	30¼	29	29½	28½	8,642
Victoria, c.	25	100,000	4¼	4	4½	4⅛	4¼		4⅜		4⅜		4⅜	4¼	1,740
Winona, c.	25	100,000	8¼	8	9⅛	8⅛	10	9¼	10	9⅜	9½	9	9⅜	8½	5,210
Wolverine, c.	25	60,000	65	64½	65	64¼	67½	64⅜	67½	67	68	66¼	67	66¾	1,032
Wyandot	25	100,000	1¼		1⅜	1⅛			1⅜		1⅛				280

* Boston Stock Exchange. † Ex Dividend. ‡ Assessment Paid. Total sales, 182,451 shares.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	June 5. H.	June 5. L.	June 6. H	June 6. L.	June 8. H.	June 8. L.	June 9. H.	June 9. L.	June 10. H.	June 10. L.	June 11. H.	June 11. L.	Sales.
Central Eureka	Cal.	$400,000	.93								.93		.93	.91	1,000
Coleban	Nev.	1,000,000	.35	.33	.37	.34	.38	.39	.30		.29	.28	.29		6,900
Esperanza	Nev.	1,000,000	.07	.12	.12		.13		.13		.12				7,400
Eula Con	Nev.	750,000													
Gipsy Queen	Nev.	750,000	.27		.27		.28	.27	.27		.28	.27	.27		4,500
Gold Ut., Con	Nev.	750,000	.22	.22	.23				.24	.23					5,300
Lucky Tom	Nev.	1,000,000	.15				.16		.16	.15	.16		.15		3,600
Mac Namara	Nev.	500,000	.40				.39				.40	.39	.38		2,348
Mont-Tonopah	Nev.	1,000,000	1.17½	1.10	1.17		1.17½	1.12½			1.15		1.15		2,050
Paymaster	Nev.	750,000	.33	.29					.25	.24	.23	.22			7,550
Rescue	Nev.	500,000	.18						.17	.15	.17	.15	.16		2,400
Salt Lake & Ton.	Nev.	300,000											.55		200
South Eureka	Cal.	300,000													
Tonopah-Belmont	Nev.	2,000,000	2.35		2.40	2.30	2.35				2.25		2.25	2.17½	1,850
Tonopah Fraction	Nev.	750,000													
Tonopah Mfg. Co.	Nev.	1,000,000													
Tonopah Midway	Nev.	1,000,000					.64								100
Tonopah North Star	Nev.	750,000	.55						.51	.50	.50		.50		1,500
Tonopah Union	Nev.	750,000	1.45	1.40			1.50				1.60	1.50	1.60	1.55	1,000
Utopia	Nev.	1,000,000	.13		.23				.38				.43	.38	5,800

* San Francisco & Tonopah Mining Exchange. Total sales, 52,648 shares.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val	June 10. H.	June 10. L.	June 11. H.	June 11. L.	June 12. H.	June 12. L.	June 13. H.	June 13. L.	June 15. H.	June 15. L.	June 16. H.	June 16. L.	Sales
Allis-Chalmers, U. S.	100	12⅛	12⅛	12⅜	12⅜					13⅛	13⅛			300
Allis-Chalm's, pf, U.S.	100											12⅛	12⅛	100
Am. Agr. Chem., U.S.	100	17	17											10
Am. Agr. Chem. pf, U.S.	100													400
Am. Sm. & Ref., U.S.	100	45⅛	44⅜	46¼	45⅛	46⅛	46⅜					46¾	45⅛	12,340
Am. Sm. & Ref. pf, U.S.	100	93¾	92¾	93½	92¾	94	94	94	94					3,471
Am. Steel & Fdy., U.S.	100											94	93	
Am. S. & Fdy. pf., U.S.	100													
Col. Fuel & I., Colo.	100	66	64¾	67	65½	68¾	67½	68	67¾	67	64¾	66	63	14,900
Col. & H. C. & I., Colo.	100	15½	15½	16	15½	18	17	18	17¾					1,300
†Crucible Steel, U. S.	100	15	14½	15	14⅜	15¾	15	15¾	15⅜	15⅜	15			6,865
†Crucible Steel, pf, U S	100	80¾	80½	81	80¼	83¼	81	83¼	82⅜	83	82¾			1,981
†Mong. R. Coal, Pa.	100	10½	10½	10¼	10½	10¾	10⅜			10½	10¼			2,125
†Mong. R. Coal pf, Pa	100			40	39¾	40	39⅞	40¼	40¼	40	40			828
National Lead, U.S.	100	15⅜	15⅜	16	15⅜	17⅛	16¾	17¼	17¾	16½	16¼			3,845
National Lead pf, U.S.	100													
†Phila Nat. Gas	100	40¾	40¼	41¾	41⅜	42¼	42⅜			42	42			930
†Phila Nat. Gas, pf	100													
†Pittsburg Coal, Pa.	100	27	27	27	27	27⅜	27¾			27	27			805
†Pittsburg Coal pf, Pa	100	85½	85	86	85¼	86⅞	86	86¾	86¾	86⅛	83¾			1,168
Republic I & S., U.S.	100	13¾	13¼	15	13¾	15⅜	15½	16	15⅞	15⅜	14⅜	14½	13⅝	9,275
Republic I. & S., pf, U.S.	100	74	73⅜	74¾	74¼	76¼	75¼			74½	74	74	73	1,000
Sloss-Shef S. & I., Ala.	100	40½	38⅛	41	40¼	43⅛	41	45	43¼	43	40	40	39⅜	6,950
Sloss-Shef S. & I. pf, Ala.	100													
Standard Oil, U.S.	100	642	636	640	640	650	650	650	636	650	649	649	648	620
Tenn. C. I. & R. R., Ala.	100	50	47⅝	51⅞	51	54⅜	52	54⅞	54	53	51½	51¼	50	23,995
U. S. Red & Ref., U. S.	100													
U.S. Red & R. pf., U.S.	100	48	48											160
U.S. Steel Corp., U.S.	100	29⅝	28⅞	30⅜	29⅝	31⅛	30¾	31½	31¼	30¾	30⅛	30⅜	29¼	150300
U.S. Steel Corp. pf, U.S.	100	79¾	78¾	81	79⅝	81⅞	80⅝	81¾	81⅛	81	80¼	80¼	79½	79,790
Va.-Car Chem., U.S.	100	54⅜	52¼	54½	53½	56⅜	55	56¼	56	55½	55⅛	56⅛	54¾	6,545
Va.-Car Chem. pf, U.S.	100	118½	118½			120	120	119	119					205
Va. I. C. & Coke, U. S.	100			30	30									100

* New York Stock Exchange. † Pittsburg Stock Exchange. ‡ Ex-Dividend. Total sales, 326,928 shares.

COLORADO SPRINGS, COLO.*

Name of Company.	Par val	June 8. H.	June 8. L.	June 9. H.	June 9. L.	June 10. H.	June 10. L.	June 11. H.	June 11. L.	June 12. H.	June 12. L.	Juue 13. H.	Juue 13. L.	Sales
Acacia	$1	.08⅝	.07¾	.08⅝	.07¾	.08¼	.07½	.08⅜	.07¾	.08¼	.08			
Am. Con.	1	.02½	.02	.02½	.02	.02¼	.02	.02¾	.02⅜	.02⅝	.02½			4,000
Anaconda	1	.15¼	.13⅝	.15¼	.13½	.15	.13⅝	.15½	.13¼	.15	.13½			2,000
Ben Hur	1	.02¾	.02	.02		.02¼	.02	.02		.02				400
Blue Bell	1	.06	.05	.06	.05	.06	.05	.06	.05	.06	.05			1,000
C. C. & M.	1	.02¼	.02	.02¼	.02	.02¼	.02	.02		.02				
C. K. & N.	1	.20¼	.20	.20¼	.20	.20¼	.20	.20½	.19¾	.20¼	.19¾			15,000
C. C. Con.	1	.05	.04	.05	.04	.04		.05	.04	.04½				
Coriolanus	1	.03	.02⅞	.03	.02⅞	.03		.03		.03				5,000
Des Moines	1	.02⅝		.02¾	.02½					.04				4,000
Dr. Jack Pot	1	.09		.09	.08	.09		.09	.08¼	.09	.07½			2,000
Elkton Con.	1	.42	.41	.42	.41½	.41⅝	.40	.42	.40	.42	.40½			4,500
El Paso	1	.63	.62⅝	.63	.62⅜	.63	.62	.62	.61¾	.61½	.61			6,700
Fannie Rawlings	1	.03⅜	.03½	.03⅜	.03½	.03⅜	.03⅜	.03⅜	.03⅜	.03⅜	.03½			
Findley	1	.13⅜	.13¼	.14⅜	.13½	.14⅜	.13¾	.15	.13⅜	.14				3,000
Gold King	1													
Gold Dollar Con.	1	.05¼	.05	.05¼	.05	.05¼	.05	.05½	.05	.05½	.05			24,000
Golden Cycle	1	.72	.71	.72	.71	.72	.70½	.72	.70	.72	.70			500
Golden Fleece	1	.11	.05	.11	.05	.12	.05	.12		.12				
Gould	1	.04	.03½	.04	.03½	.04		.04	.03½	.03½	.02¾			1,000
Hart	1	.02½		.02½		.02½		.02½		.05	.02			
Isabella	1	.16¼	.16	.16½	.16	.16¾	.15¼	.15½	.15	.15½	.15			7,000
Jack Pot	1	.10								.10				
Last Dollar	1	.60		.60		.60		.60		.60				
Lexington	1	.04	.03½	.04	.03½	.04		.04¼	.03¼					2,500
Little Puck	1	.03		.03		.03	.02⅝	.03¼	.02½	.02½				
Mollie Gibson	1	.07	.06	.07	.06	.06½	.06	.06		.07	.06			1,000
Moon Anchor	1	.09	.07½	.09	.07½	.09	.07¾	.09	.07¼	.09	.07½			
New Haven	1	.02¾	.02½	.02¼	.02¼	.02½		.03	.02⅝	.02⅞	.02¾			4,000
Pharmacist	1	.04⅜	.04	.04⅜	.04	.03⅞	.03¾	.03¾		.04¾	.03¾			2,000
Pinnacle	1	.04¼		.04¼		.04¼		.04¼		.04¼				
Pointer	1	.01¾		.01¾	.01	.01¾	.009	.01¾	.009	.01¾	.009			
Portland	1	1.35	1.30	1.35	1.30	1.34	1.28	1.34	1.28	1.35	1.28			600
Prince Albert	1	.03	.02	.03	.02	.02½	.02	.03	.02	.03	.02			
Vindicator	1	.91	.89¾	.91	.89¾	.91	.88	.91	.85	.91				1,000
Work	1	.06¾		.06¾		.06¾	.05	.06¾		.06¾				

*Colo. Springs Mining Stock Exchange. † Holiday. All mines are in Colorado. Total sales 88,200 shares.

COLORADO SPRINGS. (*By Telegraph.*)

Name of Company.	June 15. H.	June 15. L.	June 16. H.	June 16. L.	Name of Company.	June 15. H.	June 15. L.	June 16. H.	June 16. L.
Acacia	.08⅜	.08	.08⅜	.08	Isabella	15¾	.15¼	.15⅜	.15
Am. Con	.03	.02⅜	.03	.02⅛	Jack Pot	.09	.08	.09	.08
Anaconda	.15	13⅛	.15	.13	Keystone	.05	.04¾	.05¼	.04¾
Blue Bell	.06	.05	.06	.05	Last Dollar	.60	.30	.60	.30
Cripple Creek Con	.04¾	.04	.05	.04	Lexington	.04	.03½	.04	.03½
C. K. & N.	.20¼	.20	.20¼	.20	Little Puck	.03	.02½	.03	.02
Doctor Jack Pot	.09	.08	.09	.08	Mollie Gibson	.06	.06¼	.06¼	.06⅝
Elkton, Con	.41⅝	.40¾	.41⅝	.40½	Moon Anchor	.09	.07½	.09	.07⅝
El Paso	.62	.60	.61½	.60	Old Gold	.07	.06¾	.06⅞	.06⅜
Findley	.14	.13½	.14¼	.13¾	Pharmacist	.04¼	.03¾	.04¼	.03¾
Gold Dollar Con	.05¼	.05	.05¼	.05⅛	Pinnacle	.04¼	.03¾	.04¼	.03¾
Golden Cycle	.71⅜	.71	.72	.70½	Portland	1.30	1.28	1.31	1.28¾
Golden Fleece	.12	.05	.12	.05	Vindicator	.90	.87⅜	.92	.87⅜
Gould	.03½	.03	.03⅝	.03	Work	.05¾	.05⅛	.05⅞	.05⅝

SAN FRANCISCO (*By Telegraph*)

Name of Company.	June. 15.	June. 16.	Name of Company.	June. 15.	June. 16.
Belcher	.45	.44	Justice	.14	.14
Best & Belcher	2.40	2.00	Mexican	1.20	1.10
Caledonia	1.35	1.25	Occidental Con.	.27	.34
Challenge Con	.45	.43	Ophir	1.70	1.55
Chollar	.25	.23	Overman	.40	.37
Confidence	1.35	1.15	Potosi	.34	.31
Con. Cal. & Va.	1.60	1.55	Savage	.20	.18
Con. Imperial	.05	.05	Sierra Nevada	.78	.74
Crown Point	.26	.25	Union Con.	.90	.88
Gould & Curry	.42	.40	Utah Con.	.30	.28
Hale & Norcross	.63	.60	Yellow Jacket	.62	.59

STOCK QUOTATIONS

MEXICO*. June 5.

Name of Company	Share Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango.				
Ca. Min. de Penoles...	2,500	$50.00	$4,000	$4,500
San Andres de la Sierra.....	200	.....	10,000	.....
Guanajuato.				
Angustias, Pozos....	2,400	5.00	70	72
Cinco Senores y An., aviadoras.....	2,000	15.00	185	190
Cinco Senores y An., aviada.....	400	10.00	160	170
Providencia, San Juan de la Luz.....	6,000	2.00	115	118
Queensland y Australia.....	300	.....	90	95
Guerrero.				
Delfina, 1st serie	2,500	.....	45	40
Delfina, 2d serie.	2,500	.....	30	29
Garduno y Anexas.	7,200	.....	45	60
Hidalgo.				
Amistad y Concordia.	9,600	6.90	76½	77½
Carmen, aviada.....	1,100	.....	160	175
Guadalupe Fresnillo Mill.....	1,000	.....	250	300
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora.	1,536	.....	1,100	1,120
La Blanca, aviada...	768	.....	850	880
La Reina y An., aviadora.....	5,600	.....	22	25
Luz de Maravillas, aviadas.....	1,100	.....	20	.....
Maravillas y An., aviador.....	1,680	.....	90	.....
Maravillas el Lobo...	1,000	.....	130	180
Palma y An., aviador.....	1,800	.....	.....	12
Real del Monte.....	2,554	10.00	650	700
Refugio, avadia.....	12,800	.....	7	5
Santa Ana y An., aviadora	1,800	.....	30	40
Santa Ana y An., aviada.....	600	.....	25	35
Sta. Gertrudis y An., aviadas	9,600	.....	.....	7
Sta. Gertrudis y An., aviadora.....	28,800	1 00	79½	80
Santo Tomas Apostol aviadoras	5,100	.....	1	3
San Felipe de Jesus, aviadora.....	3,600	.....	25	30
San Felipe de Jesus, aviada	1,200	.....	.....	10
San Rafael y An., Trompillo.....	1,200	12.00	1,110	1,190
San Rafael y An., aviada.....	1,200	4.00	380	390
Soledad, aviada.....	960	0.00	370	380
Sorpresa, aviada.....	960	5.00	314	318
Mexico.				
Alacran	$2,400	.....	35	45
Aldebarran.....	.....	.....	83	90
Buen Despacho.....	3,000	.....	82	85
Dos Estrellas.....	3,000	30.00	2,300	2,400
La Esperanza (El Oro)	3,000	10.00	1,320	1,350
La Reformia, aviadores.....	2,000	.....	88	95
Providencia, pagadoras.....	1,600	.....	.....	.....
Providencia, liberadas.....	900	.....	.....	.....
Santa Ana, Esperanza.....	2,400	.....	70	90
Michoacan.				
Luz de Borda, aviadora.....	3,000	.....	80	95
Luz de Borda, aviada	1,000	.....	23	26
Nerevo Leon:				
La Fraternal.....	1,000	.....	600	550
Nornas de Bajan.....	1,000	.....	600	550
Santiago y An., Tial.	4,000	.....	.....	.....
San Luis Potosi.				
Concepcion y An.....	3,000	.....	100	105
El Barreno, aviadora	2,000	2.00	50	55
Sta. Maria de la Paz.	2,400	20.00	685	700
San Diego y Annexas.	2,400	4.00	12	20
Zacatecas.				
Asturiana y An.....	2,500	.....	80	90
Candelaria y Pinos ..	2,500	10.00	320	330
Cubiertas.....	2,400	.....	.....	.....
Esperanza y An.....	2,400	.....	58	65
Lourdes.....	2,500	.....	40	50
Luz de Minillas, pagadoras.....	2,000	.....	18	25
Nueva Quebradilla, aviadoras.....	2,400	.....	42	35
Nueva Quebradilla, avaidas.....	600	.....	45	40
San Carlos y Annexas	2,500	20.00	145	150
Sta. Maria de Gaud.	2,500	10.00	60	70
Miscellaneous.				
Bartolome de Medina	2,000	1.50	72	75
Guadalupe Hacienda	10,000	6.00	.....	.....
La Luz Hac. (Pachuca).....	3,750	.....	280	290
La Reina (Chihuahua).....	192	.....	.....	.....
Naica (Chihuahua)...	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora.....	1,800	10.00	700	900
Natividad (Oaxaca) aviadas.....	600	4.00	700	900
San Francisco Hac...	6,000	1.00	54	56
Santa Ana Huantla Morelos.....	4,000	.....	.....	.....
Union Hacienda.....	5,000	5.00	225	240

*Values are in Mexican currency.

SALT LAKE CITY.* June 13.

Name of Company	Shares.	Par Val	High	Low	Sales.
Ajax	300,000	$10	.25	.20	2,600
Ben Butler.....	500,000	1	.13	.12½	3,200
California	300,000	1	.13¾	.13¼	3,100
Carisa.....	500,000	1	.08¾	.08	8,500
Con. Mercur...	1,000,000	5	1 27½	1.27	400
Comstock.....	.....	...	1.00	1.00	100
Daly.....	.....	...	1.70	1.70	100
Daly-Judge....	300,000	1	10.75	10.00	1,675
Daly-West	300,000	20	44.90	44.40	755
Grand Central..	250,000	1	4 65	4.50	400
L Mammoth .	150,000	1	1 20	.87½	60,800
M. Washington.	300,000	...	04⅜	.03⅜	16,000
Mammoth.....	400,000	25	1 12½	1.12½	200
Majestic Cop...	.....	.....	.....	.....	.....
May Day.....	400,000	0.25	.22½	.21½	10,700
N. Y. Bonanza.	.....	.....	.....	.21½	3,200
Petro.....	.....	.....	.....	.10	3,000
Sacramento ..	1,000,000	5	.25	.24¾	6,300
Silver Shield..	.....	...	.06	.05½	2,000
South Swansea.	300,000	1	.17	.16	2,200
Star Con	500,000	1	.28	.25½	46,650
Uncle Sam.....	500,000	1	.28½	.23½	2,900
Utah.....	100,000	10	.69	.63¼	400
Victor	500,000	1	.16¼	.16¼	300
Wabash	.....	...	.23½	.20¾	4,800
Yankee Con....	500,000	1	.39	.36½	1,400

All mines are in Utah. *By our Special Correspondent. Total sales, 181,670 shares.

ST. LOUIS, MO. June 13.

Name.	Capital Stock	Par val.	Prices. Bid.	Prices. Ask.
Am. Nettie, Colo ...	$3,000,000	$10	$0.60	$0.80
Catherine Lead, Mo.	500,000	10	1.80	3.00
Central Coal & C. ...	1,875,000	100	59.00	62.50
Central C. & C., pf..	1,875,000	100	73.00	74.25
Central Lead, Mo..	1,000,000	10	120.00	130.00
Columbia Lead, Mo.	$500,000	10	$12.00	14.00
Con. Coal, Md.....	500,000	100	22.50	23.50
Doe Run Lead Co..	1,500,000	100	107.50	110.00
Granite Bimet. Mt..	1,000,000	10	55 00	.90
St. Joe Lead, Mo..	6,000,000	10	16.00	18.00

* From Our Special Correspondent.

PHILADELPHIA, PA.*

Name and Location of Company.	par val	June 10. H.	June 10. L.	June 11. H.	June 11. L.	June 12. H.	June 12. L.	June 13. H.	June 13. L.	June 15. H.	June 15. L.	June 16. H.	June 16. L.	Sales
Am. Alkali, Mich.....	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement.....	10	.....	.....	8	8	7⅞	7⅞	.....	.....	.....	.....	.....	.....	115
Cambria Iron, Pa.....	50	47	47	.....	.....	46¾	46¾	.....	.....	.....	.....	.....	.....	41
Cambria Steel, Pa.....	50	22	21⅞	22⅛	22	23¼	23	23⅜	23⅛	23¼	23	23¼	22⅞	6,167
Penn. Steel, pfd.....	100	.....	.....	.....	.....	.....	.....	.....	.....	89	89	89	89	35
Susq. I. & S., Pa.....	5	2	2	.....	.....	1⅛	1⅛	1⅛	1⅛	1⅛	1⅛	1⅛	1⅛	3,184
United Gas I., Pa.....	50	87	84⅛	88	85¾	90	88¼	90	89½	89⅛	89⅛	89½	88¼	9,730
Warwick I. & Steel...	10	.....	.....	5	5	5⅝	5	.....	.....	5	5	5⅛	5 1/16	595

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 19,876 shares.

LONDON. June 5.

Name and Country of Company	Shares Issued.	Par value. £.	Par value. s.	Par value. d.	Latest dividend. Amt. s.	Latest dividend. Amt. d.	Latest dividend. Date	Quotations. Buyers. £.	Buyers. s.	Buyers. d.	Sellers. £.	Sellers. s.	Sellers. d.
Alaska-Treadwell, g., Alaska.....	200,000	5	0	0	3	0	Apr., 1903	4	12	6	4	17	6
Anaconda, c. s., Montana.....	1,200,000	5	0	0	2	0	May, 1903	4	6	3	4	8	9
Arizona, c., Def., ord.....	63,444	1	0	0	5	6	Feb., 1903	7	15	0	8	5	0
Arizona, pref., ord.....	316,350	1	0	0	5	6	Feb., 1903	8	0	0	8	5	0
*Camp Bird, g., Colorado.....	738,000	1	0	0	0	7½	May, 1903	1	14	0	1	15	0
Central Chile, c., Chile.....	276,248	1	0	0	.....	.....	.....	.....	3	0	.....	4	0
Copiapo, c., Chile.....	112,500	2	0	0	6	10	May, 1903	1	17	6	2	2	6
De Lamar, g. s., Idaho.....	80,000	1	0	0	2	0	Nov., 1902	.....	10	0	.....	12	6
El Oro, g., Mexico.....	1,000,000	1	0	0	1	6	Dec., 1902	1	13	9	1	16	3
Frontino & Bolivia, g., Colombia.....	128,662	1	0	0	3	0	July, 1901	.....	13	9	.....	16	3
Le Roi, g., British Col.....	200,000	5	0	0	5	0	Nov., 1899	1	3	9	1	6	3
Le Roi No. 2, g., British Col	120,000	5	0	0	5	0	May, 1902	1	2	6	1	5	0
Mesquital, Mexico.....	250,000	.....	2	0	.....	3	Feb., 1903	.....	2	6	.....	3	6
Montana, g. s., Montana.....	657,128	1	0	0	.....	6	April, 1899	.....	1	9	.....	2	3
Mountain, c., Cal.	250,000	5	0	0	4	0	Nov., 1902	3	2	6	3	7	6
Stratton's Independence, Colorado....	1,000,007	1	0	0	.....	6	April, 1902	.....	8	6	.....	9	6
St. John del Rey., g., Brazil.....	546,265	1	0	0	.....	8	June, 1903	.....	15	0	.....	16	0
Utah Con., g. c., (Highland Boy), Utah	300,000	1	0	0	7	6	Jan., 1903	5	15	0	6	5	0
Ymir, g., British Col.....	200,000	1	0	0	1	0	Mar., 1902	.....	7	6	.....	10	6
European:													
Linares, l., Spain.....	15,000	3	0	0	.....	9	Oct., 1902	2	15	0	3	5	0
Masor & Barry, c., sul., Port'g'l.....	185,172	1	0	0	11	0	May, 1903	3	7	6	3	12	6
Rio Tinto, c., Spain.....	325,000	5	0	0	27	6	Apr., 1903	46	5	0	46	10	0
Rio Tinto, pref., Spain.....	325,000	5	0	0	2	6	Apr., 1903	6	0	0	6	5	0
Tharsis, c., Spain.....	625,000	2	0	0	6	0	May, 1903	3	15	0	4	0	0
Australia and New Zealand:													
Assoc. Gold Mines, W. Australia.....	495,388	1	0	0	1	6	Jan., 1900	1	15	0	1	17	6
Briseis, Tin, Tasmania.....	600,000	1	0	0	.....	.....	.....	.....	5	0	.....	6	0
Broken Hill Pr'p., s., N. S. Wales....	980,000	.....	8	0	1	0	Feb., 1903	1	10	0	1	11	3
*Cosmopolitan Prop., W. Australia ..	385,000	1	0	0	.....	6	July, 1902	.....	18	6	.....	19	6
Golden Horse Shoe, W. Australia.. ...	300,000	5	0	0	6	0	Apr., 1903	10	2	6	10	5	0
Great Fingall Con., W. Australia	250,000	1	0	0	5	0	Sept., 1902	7	8	9	7	11	3
Great Bo'd'r Pr'p., W. Australia	1,750,000	.....	2	0	.....	6	June, 1903	1	3	9	1	4	3
Ivanhoe Gold Corp. W. Australia.....	200,000	5	0	0	4	0	Jan., 1903	9	1	3	9	3	9
Kalgurli, g., W. Australia.....	120,000	1	0	0	2	6	Apr., 1903	4	12	6	4	15	0
Lake View Cons., g., W. Australia....	250,000	1	0	0	rts.		Aug., 1902	2	5	0	2	7	6
Mt. Lyell M. & R. I., c., Tasmania.....	275,000	3	0	0	1	0	Apr., 1903	3	1	3	3	3	9
Mt. Morgan, g., Queensland.....	1,000,000	1	0	0	.....	3	May, 1903	3	7	6	3	12	6
Waihi, g., New Zealand	497,412	1	0	0	2	6	June, 1903	5	8	9	5	11	3
Indian:													
Champion Reef, g., Colar Fields.....	473,000	.....	10	0	4	6	May., 1903	7	6	3	7	8	9
Mysore Gold, Colar Fields.....	630,000	.....	10	0	5	0	Mar., 1903	7	6	3	7	8	9
Nundydroog, g., Colar Fields.....	484,000	.....	10	0	1	6	Mar., 1903	2	11	3	2	13	9
Ooregum, g., Colar Fields.....	343,000	.....	10	0	1	6	Apr., 1903	1	13	9	1	16	3
Ooregum, pref., g., Colar Fields.....	240,000	.....	10	0	1	6	Apr., 1903	2	3	9	2	6	3
African:													
Angelo, g, Transvaal.....	600,000	1	0	0	6	0	Feb., 1903	7	0	0	7	5	0
Bonanza, g., Transvaal.....	200,000	1	0	0	12	0	Feb., 1903	3	12	6	3	17	6
British South Africa.....	4,436,019	1	0	0	rts.		May, 1899	2	18	9	3	1	3
Cape Copper, S. Africa.....	300,000	2	0	0	1	0	June, 1903	2	15	0	2	17	6
Cape Copper, pref., S. Africa.....	75,000	2	0	0	1	0	June, 1903	3	2	6	3	7	6
City and Sub'n (New), g., Transvaal...	340,000	4	0	0	8	0	Aug., 1899	6	7	6	6	12	6
Crown Reef, g., Transvaal.....	120,000	1	0	0	11	0	May. 1903	16	15	0	17	5	0
De Beers Con., d., pref., Cape Colony.	800,600	2	10	0	10	0	Mar., 1903	19	8	9	19	11	3
De Beers Con., def.	1,000,000	2	10	0	12	6	Mar., 1903	21	8	3	21	8	9
East Rand, Prop, Transvaal.....	970,000	1	0	0	rts.		May, 1902	7	5	0	7	7	6
Ferrcira g., Transvaal.....	90,000	1	0	0	2	0	May,. 1903	21	0	0	22	0	0
Geldenhuis Est., g., Transvaal.....	200,000	1	0	0	5	0	Feb., 1903	6	2	6	6	5	0
Geduld, g , Transvaal.....	400,000	1	0	0	rts.		Mar., 1902	6	13	9	6	18	3
Henry Nourse, g., Transvaal.....	125,000	1	0	0	8	0	Feb., 1903	9	0	0	9	5	0
Jagersfontein, d., Orange F. S.....	200,000	5	0	0	6	0	Nov., 1899	29	17	6	30	2	6
Jubilee, g., Transvaal.....	50,000	1	0	0	5	0	June, 1903	5	5	0	5	10	0
Jumpers, Transvaal.....	100,000	1	0	0	5	0	Aug., 1899	3	10	0	3	15	0
Langlaagte Est., g., Transvaal.....	470,000	1	0	0	3	0	Sept., 1899	3	18	9	4	1	3
May Con., g., Transvaal.....	288,750	1	0	0	3	0	Feb., 1903	4	5	0	4	7	6
Meyer & Charlton, g., Transvaal.....	100,000	1	0	0	3	0	Feb., 1903	5	10	0	5	15	0
Modderfontein, g., Transvaal.....	290,000	1	0	0	rts.		Apr., 1902	10	0	0	10	2	6
Namaqua, c., Cape Colony.....	94,331	2	0	0	2	0	June, 1902	2	17	6	3	0	0
Primrose (New), g., Transvaal.....	325,000	1	0	0	2	0	Feb., 1903	3	16	3	3	18	9
Rand Mines, g., S. Africa.....	1,795,958	.....	5	0	4	0	June, 1902	10	2	6	10	3	9
Robinson, g., Transvaal.....	750,000	5	0	0	6	0	Feb., 1903	10	8	9	10	11	3
Robinson Deep, g., Transvaal.....	950,000	1	0	0	5	0	May, 1899	4	15	0	4	17	6
Rose Deep, Transvaal.....	425,000	1	0	0	2	0	Feb 1903	8	10	0	8	15	0
Salisbury, g., Transvaal.....	100,000	1	0	0	2	0	Mar., 1899	2	10	0	2	15	0
Sheba, g., Transvaal..	1,075,000	1	0	0	.....	6	July, 1898	.....	19	6	1	0	6
Village Main Reef, Transvaal.....	400,000	1	0	0	5	0	Oct., 1902	8	5	0	8	10	0
Wemmer, Transvaal.	80,000	1	0	0	5	0	May, 1903	12	5	0	12	15	0

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-Dividend.

LONDON. (*By Cable*).*

Name of Company.	June 9. £.	June 9. s.	June 9. d.	June 16. £.	June 16. s.	June 16. d.
Anaconda.....	4	5	0	4	7	6
British South Africa.....	2	13	9	2	15	0
Camp Bird.....	1	12	7½	1	10	0
Con. Gold-Fields.....	6	12	6	6	12	6
De Beers Con. def.....	21	5	0	21	8	9
East Rand.....	7	3	9	7	1	3
El Oro, Mex.....	1	13	9	1	12	6
Jagersfontein.....	29	15	0	30	0	0
Johannesburg Invest..	3	0	0	2	18	9
Modderfontein.....	9	11	3	9	15	0
Rand Mines.....	9	16	3	9	18	9
Rio Tinto com	45	17	6	46	12	6
Simmer & Jack.....	1	9	4½	1	8	1½
Tomboy.....	1	12	6	1	11	10½

* Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. June 4.

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing Fr.
Boleo.....	Lower Cal.....	Copper.....	.....	500	176.00	1,430.00	1,405.00
Champ d'Or.....	S. Africa.....	Gold.....	3,375,000	25	3.75	20.75	20.75
Fraser River..	Brit. Col'mb..	Gold.....	250,000	25	.....	6.50	6.50
Huanchaca..... .. .	Bolivia.....	Silver.....	40,000,000	125	5.00	99.00	95.25
Laurium.....	Greece.....	Zinc, Lead....	16,500,000	500	25.00	347.00	354.00
Metaux, Cie. Fran. de.....	France.....	Metal dealers..	25,000,000	500	22.50	445.00	465.00
Nickel.....	N. Caled'nia..	Nickel.....	15,000,000	250	22.50	464.00	460.00
Sedalia & California.....	Calif., U. S..	Oil.....	1,000,000	1	.....	8.00	8.00
Vielle Montagne.....	Belgium.....	Zinc.....	9,000,000	30	30.00	644.00	659.00

TORONTO, ONT.* June 12.

Name of Company.	par val	Prices. High.	Prices. Low.	Sales.
Black Tail.	$1	.05½	.02¼	.....
Cariboo (Mc. K.).....	1	.14	.09	.....
Cariboo (Hyd.).....	1	.75	.73	.....
Center Star.....	1	.31	.28	1,000
Crows Nest, C...	100	375	300	.....
Dominion Coal, com...	100	.89	.74	.....
Dominion S. & I.....	100	.15	10¼	25
Dominion S. & I., pref.	100	.....	.....	.....
Fairview.....	1	.03¼	.05¼	.....
Giant.....	1	.03½	.02	2,000
Granby Smelter	$10	500	480	50
Mountain Lion.....	1	.28	.20	.....
North Star.....	1	.14	.10½	.....
Nova Scotia Steel, com	100	.86	.76	.....
Payne	1	.15	.13	.....
Rambler Cariboo... ..	1	.40	.....	.....
Republic..... ..	1	.05	.02½	.....
St. Eugene..	1	.45	.35	.....
Virtue.....	1	.08	.06	.....
War Eagle Con.....	1	.14	.11	5,500

*Standard Stock and Mining Exchange. Total sales 11,160 shares

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

	Cust.	Meas.	Price.
ABRASIVES—			
Carborundum, f.o.b. Niagara Falls, Powd., F.FF.FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09½
Mont. car-lots, f.o.b., Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02½
Crude, ex-ship N. Y.; Abbott (Turkey)	lg.ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh.ton		25.00@35.00
Pumice Stone, Am. Powd.	lb.		.01¾@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04½
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.c.b. Pittsburg	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.39@2.40
Refined wood 95@97%	"		.60@.65
Purified	"		1.20@1.50
ALUM—Lump	100 lbs.		1.75
Ground	"		1.85
Porous	"		.80
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.05½
AMMONIUM—			
Carbonate, lump	"		.07½
Powdered	"		.08¼
Muriate	"		.05⅝
Lump	"		.09
Nitrate, white pure (99%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.05¾@.07¼
Oxide, com'l white, 95%	"		.09½
Com'l white, 95%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.03@.03½
Red	"		.06½@.06¾
ASPHALTUM—			
Ventura, Cal.	sh.ton		32.00
Cuban	lb.		.01¼@.03½
Egyptian, crude	"		.05½@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh.ton		25.00@27.50
92@98%	"		26.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100lbs.		1.67½@1.76
Chem. pure cryst	lb.		.05
Nitrate, powdered	"		.05½
BARIUM	Cust.	Meas.	Price.
Sulphate (Blanc Fixe)	lb.		$0.01⅞
BARYTES—			
Am. Crude, No. 1	sh.ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
Floated	"		18.50
Foreign, gray	"		13.50
Snow white	"		17.00
Floated	"		19.00
BAUXITE—Ga. or Ala. Mines:			
First Grade	lg.ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.03½
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMINE—Bulk.	"		.48
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh.ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		2.00@2.15
Foreign	"		1.95@2.50
"Rosendale," 300 lbs	"		.80
Slag cement, imported	"		1.65
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh.ton		3.25
Ppt. per quality	lb.		.04¼@.05¼
CHLORINE—Liquid	"		.80
Water	"		.10
CHROME ORE—			
(50% ch.) ex-ship N. Y.	lg.ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg.ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		16.25
Fire Clay, ordinary	sh.ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.26@2.30
Gray	"		2.28@2.40
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—in bulk	100 lbs.		.47½
In bbls	"		.52½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25 lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro, (32-2-10° Be.)	"		.13¼@.13⅞
FELDSPAR—Ground	sh.ton		8.00@9.00
FLINT PEBBLES—Dan. Best.	lg.ton		14.75
French, Best	"		11.75
FLUORSPAR—			
Am. lump, 1st grade	sh.ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.90
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH—	100 lbs.		.80
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh.ton		$8.00
Pulverized	"		30.00
German, com. pulv.	lb.		.01¼@.01½
Best pulverized	"		.01½@.02
Ceylon, common pulv.	"		.02¾@.03½
Best pulverized	"		.04@.08
Italian, pulv	"		.01¼
GYPSUM—Ground	sh.ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg.ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.03
Nitrate, com'l	"		.01¼
True	"		.04
Oxide, pure copperas color.	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08½
Brown	"		.06¼@.06½
Nitrate, com'l	"		.06½
" gran.	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.75
Finishing	"		.95
MAGNESITE—Greece.			
Crude (95%)	lg. ton		5.50@6.00
Calcined	sh.ton		17.50@18.00
Bricks best imp., f.o.b., N.Y.	M.		155.00
" domes., per qual., f.o.b. Pittsburg	"		160.@200.
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01⅝
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
MANGANESE—Powdered, 70@75% binoxide	lb.		.01¼@.01½
Crude pow'd. 75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 50%, Foreign	unit		.18@.19
Domestic	"		.30
MARBLE—Flour	sh.ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse	sh.ton		33.00@38.00
Fine	lb.		.00⅝@.02
Sheets, N. C., 2x4 in.	"		.30
3x3 in.	"		.80
3x4 in.	"		1.50
4x4 in.	"		2.00
6x6 in.	"		3.00
MINERAL WOOL—			
Slag, ordinary	sh.ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.: 25@30, cold test	gal.		.13@.13½
15, cold test	"		.13½@.14
Zero	"		.18@.18½
Summer	"		.12½@.13
Cylinder, dark steam ref.	"		.14½@.15
Dark, filtered	"		.18½@.19
Light, filtered	"		.20½@.20
Extra cold test	"		.25@.31
Gasoline, 86°@90°	"		.16@.21
Naphtha, crude, 68°@72°	bbl.		11.20
"Stove"	gal.		.14½
Linseed, domestic raw	"		.41@44
Boiled	"		.46
Calcutta, raw	"		.75
OZOKERITE	lb.		.11½
PAINTS AND COLORS— ..			
Chrome green, common	"		.03
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.14
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd	"		.05⅝@.06
English flake	"		.08¼@.08½
Glassmakers'	"		.06½@.08¼
PAINTS AND COLORS—	Cust.	Meas.	Price.
Metallic, brown	sh.ton		$19.00
Red	"		16.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01½@.01⅞
Orange mineral, Am.	"		.08⅛@.08¾
Foreign, as to make	"		.08½@.10½
Paris green, pure, bulk	"		.12
Red lead, American	"		.06¼@.06¾
Foreign	"		.06⅝@.08
Turpentine, spirits	gal.		.49@.49½
White lead, Am., dry	lb.		.05½@.05⅝
American, in oil	"		.07@.09
Foreign, in oil	"		.07@.07¼
Zinc, white, Am., ex dry	"		.04⅝@.04¾
Foreign, red seal, dry	"		.06@.06¼
Green seal, dry	"		.06½@.09½
POTASH			
Caustic, ordinary	"		.04½@.04¾
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am.	"		.08¼@.08¾
Scotch	"		.08½@.09
Bromide	"		.38
Carbonate (80@85%)	"		.03½@.04⅝
Chlorate, powd.	"		.07¼@.07⅝
Crystals	"		.07@.07¼
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg.ton		9.30
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95%	"		1.86
Permanganate	lb.		.09¼@.09¾
Prussiate, yellow	"		.13¼@.13½
Red	"		.34
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.18
N. Y. agricultural	sh.ton		4.40
SALTPETRE—Crude	100 lbs.		3.20@3.35
Refined	"		4.00@4.50
SILICA—Best foreign	lg.ton		10.00@11.00
Ground quarts, ord.	sh.ton		6.00@8.00
Best	"		12.00@13.00
Lump quarts	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate Crystals	"		.34½
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ordinary, f.o.b. w'ks	100 lbs.		1.25
Extra domes. f.o.b. w'ks	"		3.50
Foreign, f.o.b. N. Y.	"		1.80
Bichromate	lb.		.06¼
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.		.75@.85
Foreign, f.o.b. N. Y.	"		.90@.92½
Caustic, 60@78%, f.o.b. w'ks	"		1.65@1.70
Foreign, f.o.b. N. Y.	"		1.90@2.00
Chlorate, com'l	"		.07¼@.07⅝
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, spot	"		2.05
Shipments	"		1.95
Peroxide	lb.		.45
Phosphate	"		.02½@.02¼
Prussiate	"		.09⅝
Sal soda, f.o.b. works	100 lbs.		.60
Foreign, f.o.b. N. Y.	"		.67½
Silicate, conc.	lb.		.05
Com'l	"		.01
Sulphate, com'l	100 lbs.		82½
Sulphide	lb.		.01¼
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
TALC—N. C., 1st grade	sh.ton		18.00
N. Y., Fibrous, best	"		10.20
French, best	100 lbs.		1.25
Italian, best	"		1.62½
TAR—Regular	bbl.		2.40
Oil barrels	"		4.40
TIN—Crystals	lb.		.22½@.23
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09½
Carbonate, ppt.	"		.09
Chloride solution, com'l	"		.02¼
Chloride granular	"		.04¼@.04⅝
Dust	"		.04⅝@.04½
Sulphate	"		.02½@.02⅝

THE RARE EARTHS.

BORON—Nitrate	lb.		$1.50
CALCIUM—Tungstate (Scheelite)	"		.60
CERIUM—Nitrate	"		10.00
DIDYMIUM—Nitrate	"		35.00
ERBIUM—Nitrate	"		40.00
GLUCINUM—Nitrate	"		20.00
LANTHANUM—Nitrate	"		30.00
LITHIUM—Carbonate	"		1.35
LITHIUM—Nitrate	oz.		.60
STRONTIUM—Nitrate	lb.		.07¼@.08¼
THORIUM—Nitrate 49@50%	"		4.50
URANIUM—Nitrate	oz.		.25
YTTRIUM—Nitrate	lb.		40.00
ZIRCONIUM—Nitrate	"		8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.